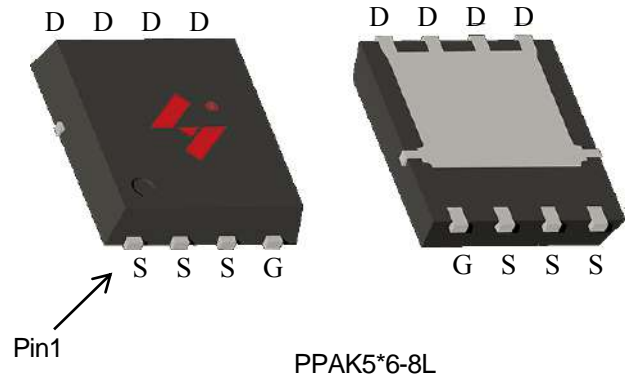
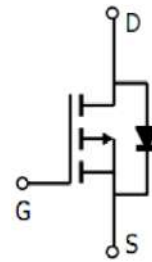


## Single P-Channel Enhancement Mode MOSFET


- -30V/-70A
- $R_{DS(ON)} = 5.9m$  (typ.) @  $V_{GS} = -10V$   
 $R_{DS(ON)} = 9.1m$  (typ.) @  $V_{GS} = -4.5V$
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen free and Green Devices Available (RoHS Compliant)



- Switching Application
- Power Management for DC/DC
- Battery Protection



Single P-Channel MOSFET

|                                                                                                                                                   |                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
|  <p style="margin: 0;">C2<br/><b>G065P03</b><br/>XYMXXXXXX</p> | <p>Package Code<br/>C2: PPAK5*6-8L</p> <p>Date Code<br/>XYMXXXXXX</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|

Note: HUAYI lead-free products contain molding compounds/die attach materials and 100% matte tin plate Termination finish; which are fully compliant with RoHS. HUAYI lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J-STD-020 for MSL classification at lead-free peak reflow temperature. HUAYI defines "Green" to mean lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

HUAYI reserves the right to make changes, corrections, enhancements, modifications, and improvements to this product and/or to this document at any time without notice.

| (Tc=25 °C Unless Otherwise Noted) |                                            |           |            |      |
|-----------------------------------|--------------------------------------------|-----------|------------|------|
| V <sub>DSS</sub>                  | Drain-Source Voltage                       |           | -30        | V    |
| V <sub>GSS</sub>                  | Gate-Source Voltage                        |           | ±20        | V    |
| T <sub>J</sub>                    | Junction Temperature Range                 |           | -55 to 175 | °C   |
| T <sub>STG</sub>                  | Storage Temperature Range                  |           | -55 to 175 | °C   |
| I <sub>S</sub>                    | Source Current-Continuous(Body Diode)      | Tc=25 °C  | -70        | A    |
| I <sub>DM</sub>                   | Pulsed Drain Current *                     | Tc=25 °C  | -280       | A    |
| I <sub>D</sub>                    | Continuous Drain Current                   | Tc=25 °C  | -70        | A    |
|                                   |                                            | Tc=100 °C | -49.5      | A    |
| P <sub>D</sub>                    | Maximum Power Dissipation                  | Tc=25 °C  | 57.7       | W    |
|                                   |                                            | Tc=100 °C | 28.8       | W    |
| R <sub>θJC</sub>                  | Thermal Resistance, Junction-to-Case       |           | 2.6        | °C/W |
| R <sub>θJA</sub>                  | Thermal Resistance, Junction-to-Ambient ** |           | 45         | °C/W |
| E <sub>AS</sub>                   | SinglePulsed-Avalanche Energy ***          | L=0.3mH   | 330***     | mJ   |

Note: \* Repetitive rating pulse width limited by max.junction temperature.  
 \*\* Surface mounted on 1in2 FR-4 board.  
 \*\*\* Limited by T<sub>Jmax</sub>, starting T<sub>J</sub>=25 °C, L = 0.3mH, R<sub>G</sub>= 25Ω, V<sub>GS</sub> =-10V.

(Tc =25 °C Unless Otherwise Noted)

| (Tc =25 °C Unless Otherwise Noted) |                                  |                                                            |      |       |      |    |
|------------------------------------|----------------------------------|------------------------------------------------------------|------|-------|------|----|
| BV <sub>DSS</sub>                  | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =-250uA               | -30  | -     | -    | V  |
| I <sub>DSS</sub>                   | Drain-to-Source Leakage Current  | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V                 | -    | -     | -1   | uA |
|                                    |                                  | T <sub>J</sub> =125 °C                                     | -    | -     | -50  |    |
| V <sub>GS(th)</sub>                | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250uA | -1.0 | -1.5  | -3.0 | V  |
| I <sub>GSS</sub>                   | Gate-Source Leakage Current      | V <sub>GS</sub> = 20V, V <sub>DS</sub> =0V                 | -    | -     | ±100 | nA |
| R <sub>DS(ON)*</sub>               | Drain-Source On-state Resistance | V <sub>GS</sub> =-10V, I <sub>D</sub> = -20A               | -    | 5.9   | 7.5  | mΩ |
|                                    |                                  | V <sub>GS</sub> =-4.5V, I <sub>D</sub> = -20A              |      | 9.1   | 14.0 | mΩ |
| V <sub>SD*</sub>                   | Diode Forward Voltage            | I <sub>SD</sub> = -20A, V <sub>GS</sub> =0V                | -    | -0.85 | -1.3 | V  |
| t <sub>rr</sub>                    | Reverse Recovery Time            | I <sub>SD</sub> = -20A, dl/dt=100A/us                      | -    | 28    | -    | ns |
| Q <sub>rr</sub>                    | Reverse Recovery Charge          |                                                            | -    | 25    | -    | nC |

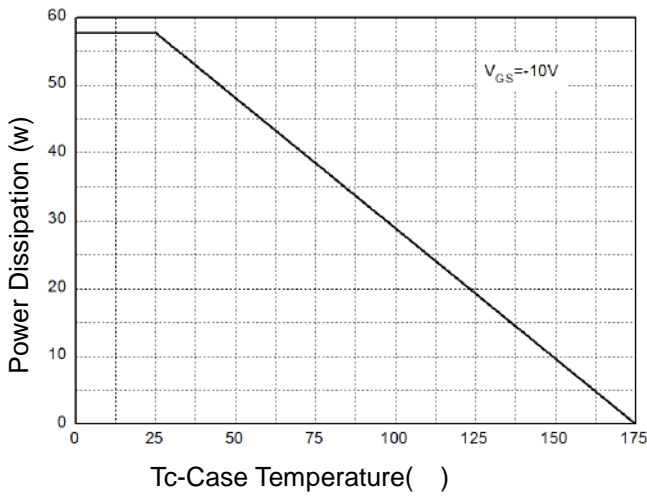
(Tc =25 °C Unless Otherwise Noted)

| R <sub>G</sub>      | Gate Resistance              | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V,<br>Frequency=1.0MHz                                 | - | 9    | - | Ω  |  |
|---------------------|------------------------------|-----------------------------------------------------------------------------------------------|---|------|---|----|--|
| C <sub>iss</sub>    | Input Capacitance            | V <sub>GS</sub> =0V,                                                                          | - | 3598 | - | pF |  |
| C <sub>oss</sub>    | Output Capacitance           | V <sub>DS</sub> =-15V,                                                                        | - | 531  | - |    |  |
| C <sub>rss</sub>    | Reverse Transfer Capacitance | Frequency=1.0MHz                                                                              | - | 142  | - |    |  |
| t <sub>d(ON)</sub>  | Turn-on Delay Time           | V <sub>DD</sub> = -15V, R <sub>G</sub> =3 Ω,<br>I <sub>DS</sub> = -20A, V <sub>GS</sub> =-10V | - | 12   | - | ns |  |
| T <sub>r</sub>      | Turn-on Rise Time            |                                                                                               | - | 19   | - |    |  |
| t <sub>d(OFF)</sub> | Turn-off Delay Time          |                                                                                               | - | 83   | - |    |  |
| T <sub>f</sub>      | Turn-off Fall Time           |                                                                                               | - | 34   | - |    |  |
| Q <sub>g</sub>      | Total Gate Charge            | V <sub>DS</sub> = -24V, V <sub>GS</sub> = -10V<br>I <sub>D</sub> = -20A,                      | - | 86   | - | nC |  |
| Q <sub>gs</sub>     | Gate-Source Charge           |                                                                                               | - | 8    | - |    |  |
| Q <sub>gd</sub>     | Gate-Drain Charge            |                                                                                               | - | 22   | - |    |  |

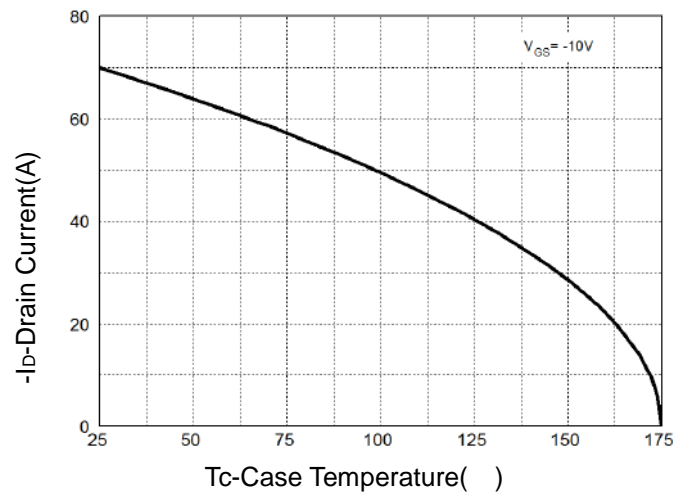
Note: \*Pulse test pulse width 300us duty cycle 2%

## Typical Operating Characteristics

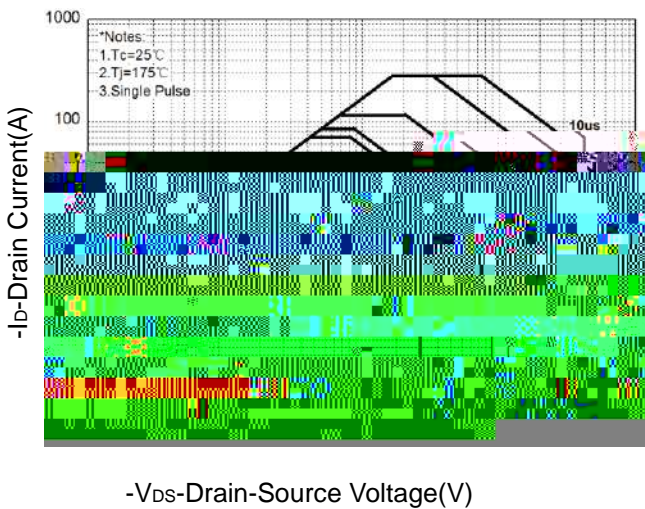
**Figure 1: Power Dissipation**



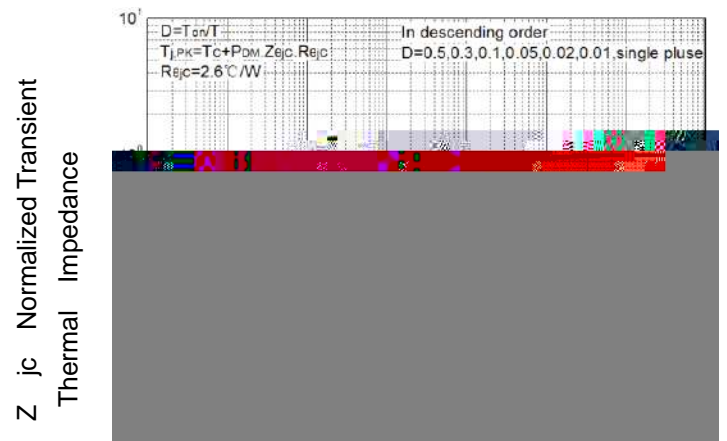
**Figure 2: Drain Current**



**Figure 3: Safe Operation Area**

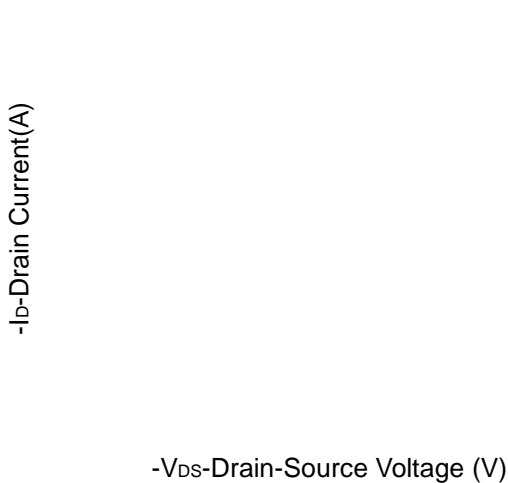


**Figure 4: Thermal Transient Impedance**

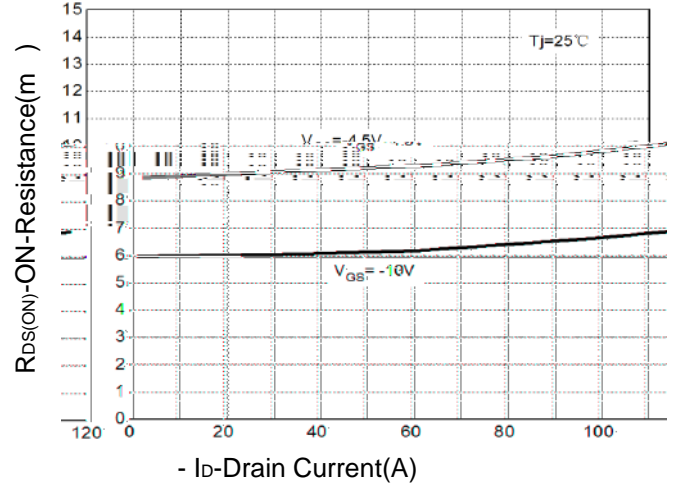


Maximum Effective Transient Thermal Impedance, Junction-to-Case

**Figure 5: Output Characteristics**

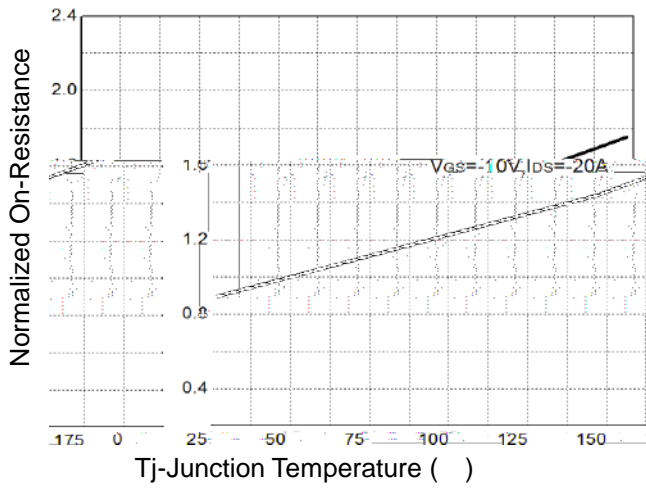


**Figure 6: Drain-Source On Resistance**

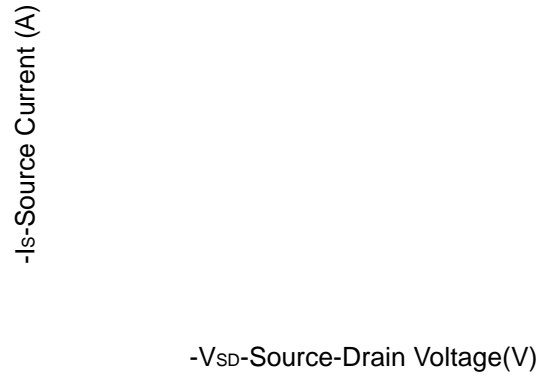


## Typical Operating Characteristics(Cont.)

**Figure 7: On-Resistance vs. Temperature**



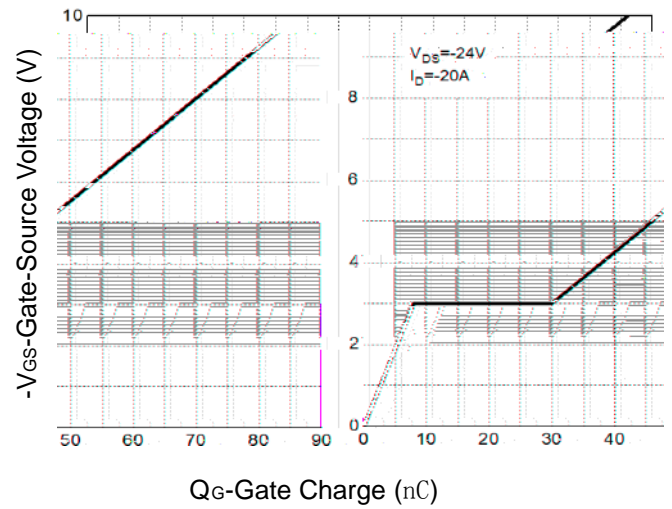
**Figure 8: Source-Drain Diode Forward**

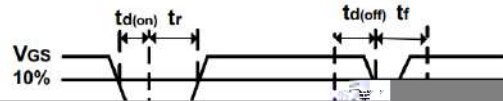
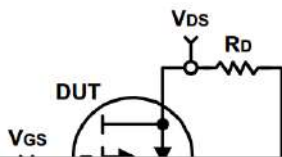
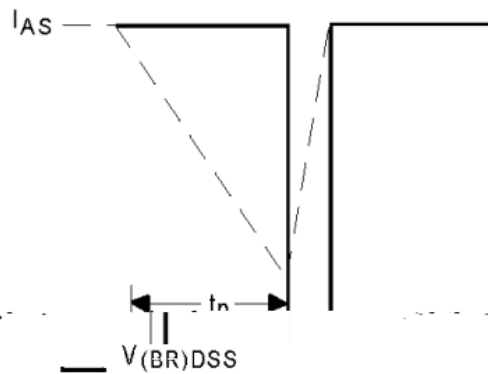
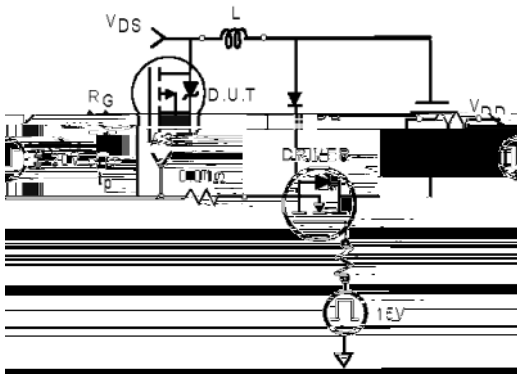


**Figure 9: Capacitance Characteristics**

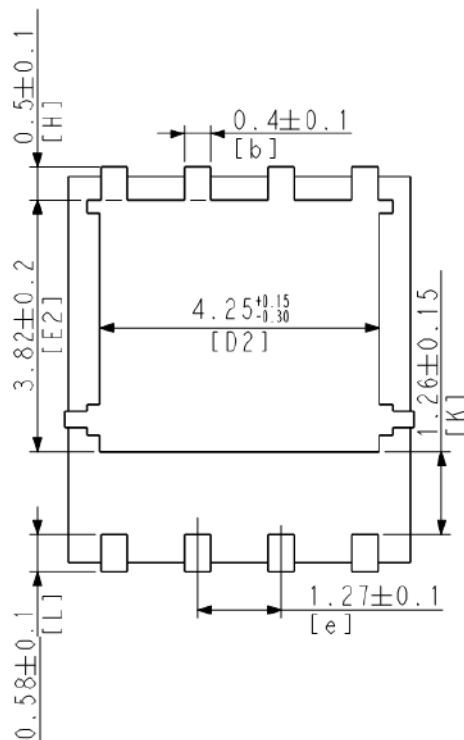
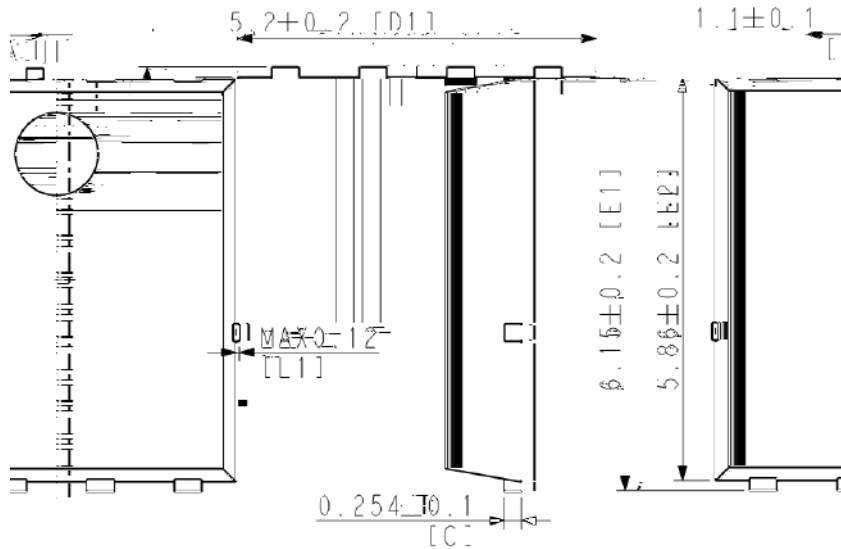


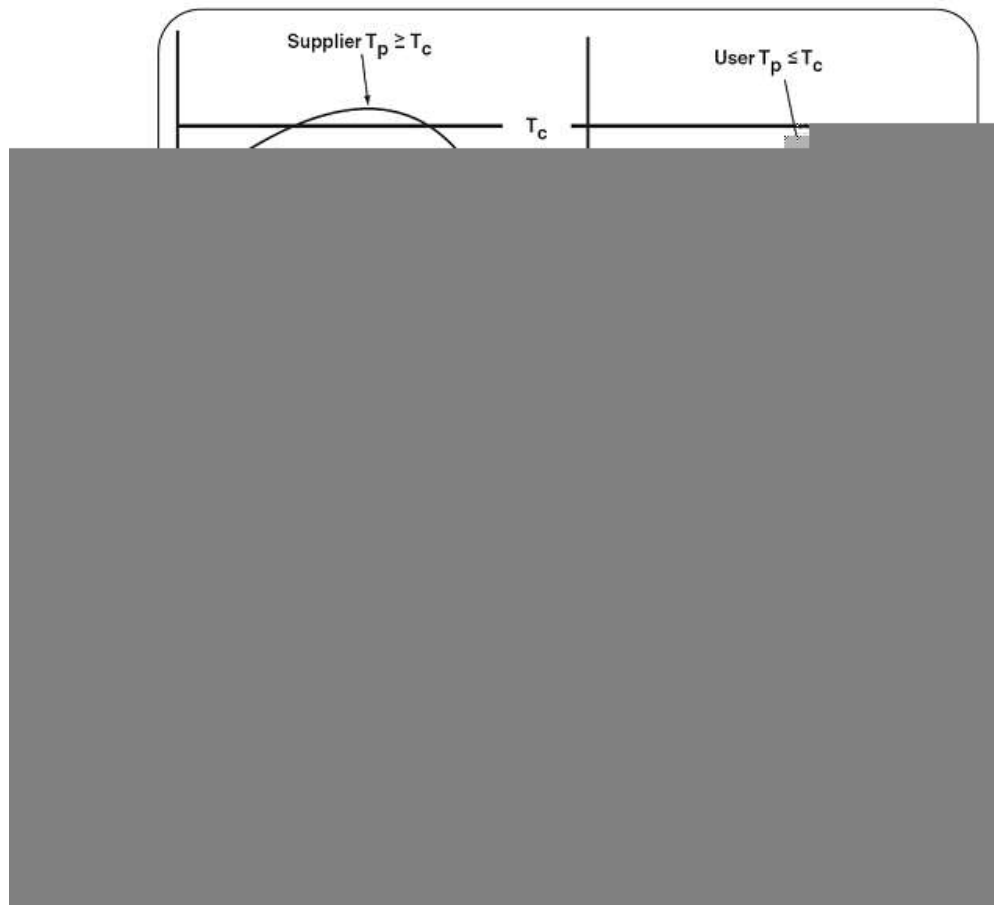
**Figure 10: Gate Charge Characteristics**





|            |      |      |
|------------|------|------|
| PPAK5*6-8L | Reel | 5000 |
|------------|------|------|





|                                                                                                                  |                                    |                                    |
|------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------|
| Temperature min ( $T_{smin}$ )                                                                                   | 100 °C                             | 150 °C                             |
| Temperature max ( $T_{smax}$ )                                                                                   | 150 °C                             | 200 °C                             |
| Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )                                                                      | 60-120 seconds                     | 60-120 seconds                     |
| Average ramp-up rate<br>( $T_{smax}$ to $T_P$ )                                                                  | 3 °C/second max.                   | 3 °C/second max.                   |
| Liquidous temperature ( $T_L$ )                                                                                  | 183 °C                             | 217 °C                             |
| Time at liquidous ( $t_L$ )                                                                                      | 60-150 seconds                     | 60-150 seconds                     |
| Peak package body Temperature<br>( $T_P$ )*                                                                      | See Classification Temp in table 1 | See Classification Temp in table 2 |
| Time ( $t_P$ )** within 5 °C of the specified<br>classification temperature ( $T_c$ )                            | 20** seconds                       | 30** seconds                       |
| Average ramp-down rate ( $T_P$ to $T_{smax}$ )                                                                   | 6 °C/second max.                   | 6 °C/second max.                   |
| Time 25 °C to peak temperature                                                                                   | 6 minutes max.                     | 8 minutes max.                     |
| *Tolerance for peak profile Temperature ( $T_P$ ) is defined as a supplier minimum and a user maximum.           |                                    |                                    |
| ** Tolerance for time at peak profile temperature ( $t_P$ ) is defined as a supplier minimum and a user maximum. |                                    |                                    |



Table 1.SnPb Eutectic Process – Classification Temperatures (Tc)

|        |        |        |
|--------|--------|--------|
|        |        |        |
| 2.5 mm | 235 °C | 220 °C |
| 2.5 mm | 220 °C | 220 °C |

Table 2.Pb-free Process – Classification Temperatures (Tc)

|                 |        |        |        |
|-----------------|--------|--------|--------|
|                 |        |        |        |
| <1.6 mm         | 260 °C | 260 °C | 260 °C |
| 1.6 mm – 2.5 mm | 260 °C | 250 °C | 245 °C |
| 2.5 mm          | 250 °C | 245 °C | 245 °C |

|               |               |                                           |
|---------------|---------------|-------------------------------------------|
|               |               |                                           |
| SOLDERABILITY | JESD-22, B102 | 5 Sec, 245 °C                             |
| HTRB          | JESD-22, A108 | 168 Hrs /500 Hrs /1000 Hrs, Bias @ 150 °C |
| PCT           | JESD-22, A102 | 96 Hrs, 100%RH, 2atm, 121 °C              |
| TCT           | JESD-22, A104 | 500 Cycles, -55 °C~150 °C                 |

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