

Features

- 100V/58A,
 $R_{DS(on)} = 6.8m\Omega(Typ.)@V_{GS}=10V$
 $R_{DS(on)} = 10m\Omega(Typ.)@V_{GS}=4.5V$
- Excellent $Q_G \times R_{DS(on)}$ product(FOM)
- SGT Gen2 Technology
- 100% avalanche tested

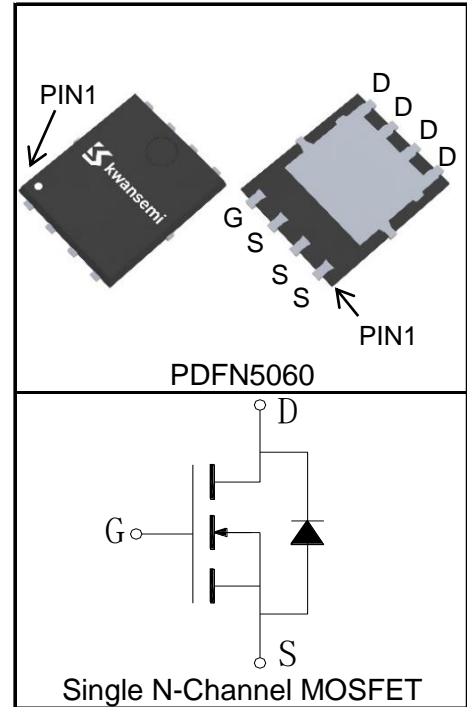
Applications

- High Frequency Switching and Synchronous Rectification



Halogen-Free

Pin Description



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Unit | |
|--|---|-------------------|------------|---|
| Common Ratings ($T_C=25^\circ C$ Unless Otherwise Noted) | | | | |
| V_{DSS} | Drain-Source Voltage | 100 | V | |
| V_{GSS} | Gate-Source Voltage | ± 20 | | |
| T_{Jmax} | Maximum Junction Temperature | 150 | $^\circ C$ | |
| T_J, T_{STG} | Operating and Storage Temperature Range | -55 to 150 | $^\circ C$ | |
| I_S | Diode Continuous Forward Current | $T_C=25^\circ C$ | 58 | A |
| Mounted on Large Heat Sink | | | | |
| $I_{DP}^{①}$ | Pulse Drain Current | $T_C=25^\circ C$ | 232 | A |
| $I_D^{②}$ | Continuous Drain Current@ $T_C(V_{GS}=10V)$ | $T_C=25^\circ C$ | 58 | A |
| | | $T_C=100^\circ C$ | 36 | |
| | Continuous Drain Current@ $T_A(V_{GS}=10V)^{③}$ | $T_A=25^\circ C$ | 17 | |
| | | $T_A=70^\circ C$ | 13 | |
| P_D | Maximum Power Dissipation@ T_C | $T_C=25^\circ C$ | 48 | W |
| | | $T_C=100^\circ C$ | 19 | |
| | Maximum Power Dissipation@ $T_A^{③}$ | $T_A=25^\circ C$ | 4.2 | |
| | | $T_A=70^\circ C$ | 2.7 | |

| Symbol | Parameter | Rating | Unit |
|---------------------------------------|--|--------|------|
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | 2.6 | °C/W |
| $R_{\theta JA}$ ③ | Thermal Resistance-Junction to Ambient | 30 | °C/W |
| Drain-Source Avalanche Ratings | | | |
| E_{AS} ④ | Avalanche Energy, Single Pulsed | 240 | mJ |

Electrical Characteristics ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol | Parameter | Test Condition | KS12050NAT2 | | | Unit |
|--------------------------------------|----------------------------------|--|-------------|------|-----------|------------|
| | | | Min. | Typ. | Max. | |
| Static Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_{DS}=250\mu A$ | 100 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=100V, V_{GS}=0V$ | | | 1 | μA |
| | | $T_J=125^\circ C$ | | | 30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_{DS}=250\mu A$ | 1.2 | 2 | 2.5 | V |
| I_{GSS} | Gate Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | | | ± 100 | nA |
| $R_{DS(ON)}$ ⑤ | Drain-Source On-state Resistance | $V_{GS}=10V, I_{DS}=20A$ | | 6.8 | 8.2 | m Ω |
| | | $V_{GS}=4.5V, I_{DS}=15A$ | | 10 | 13 | m Ω |
| Diode Characteristics | | | | | | |
| V_{SD} ⑤ | Diode Forward Voltage | $I_{SD}=20A, V_{GS}=0V$ | | 0.85 | 1.2 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD}=20A, dI_{SD}/dt=100A/\mu s$ | | 31 | | ns |
| Q_{rr} | Reverse Recovery Charge | | | 46 | | nC |
| Dynamic Characteristics ⑥ | | | | | | |
| R_G | Gate Resistance | $V_{GS}=0V, V_{DS}=0V, F=1MHz$ | | 1.5 | | Ω |
| C_{iss} | Input Capacitance | $V_{GS}=0V,$ $V_{DS}=50V,$ Frequency=200KHz | | 2385 | | pF |
| C_{oss} | Output Capacitance | | | 720 | | |
| C_{riss} | Reverse Transfer Capacitance | | | 40 | | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}=50V, I_{DS}=20A,$ $V_{GS}=10V, R_G=3\Omega$ | | 14 | | ns |
| t_r | Turn-on Rise Time | | | 19 | | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | | 36 | | |
| t_f | Turn-off Fall Time | | | 13 | | |
| Gate Charge Characteristics ⑥ | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=50V, V_{GS}=10V,$ $I_{DS}=20A$ | | 42 | | nC |
| Q_{gs} | Gate-Source Charge | | | 7.9 | | |
| Q_{gd} | Gate-Drain Charge | | | 10 | | |

Notes:

- ①Pulse width limited by safe operating area.
- ②Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 50A.
- ③When mounted on 1 inch square copper board, $t \leq 10\text{sec}$.
- ④Limited by T_{Jmax} , Starting $T_J = 25^\circ\text{C}$, $I_{ASmax} = 31\text{A}$, $L = 0.5\text{mH}$, $V_{DD} = 48\text{V}$, $R_G = 25\Omega$, $V_{GS} = 10\text{V}$. Part not recommended for use above this value. 100% Final Test at $I_{AS} = 15\text{A}$, $L = 0.5\text{mH}$.
- ⑤Pulse test; Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- ⑥Guaranteed by design, not subject to production testing.

Ordering and Marking Information

| Device | Package | Packaging | Quantity | Reel Size | Tape width |
|-------------|----------|-----------|----------|-----------|------------|
| KS12050NAT2 | PDFN5060 | Tape&Reel | 5000 | 13" | 12mm |

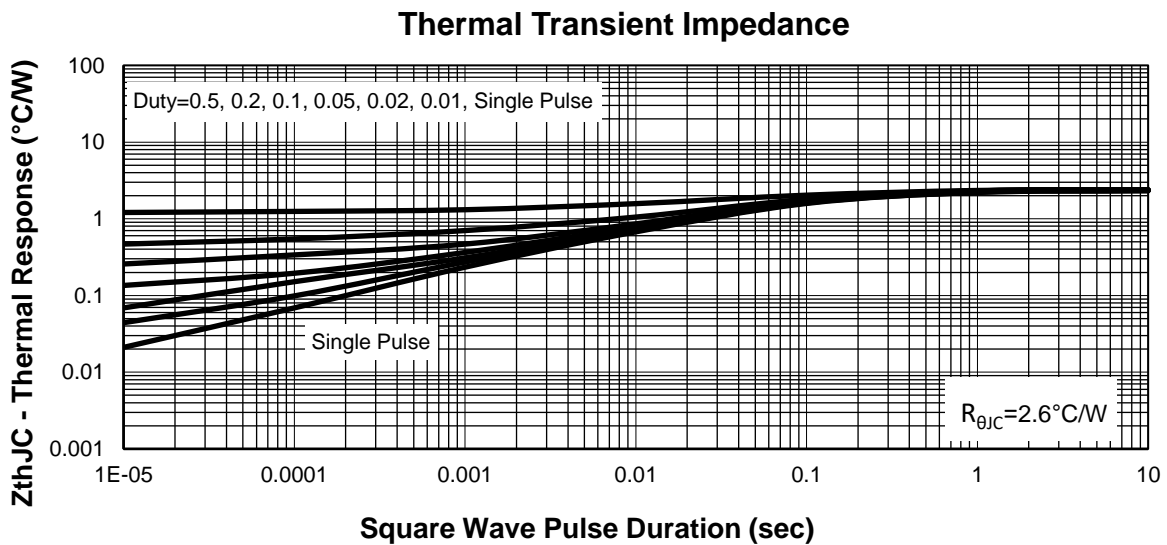
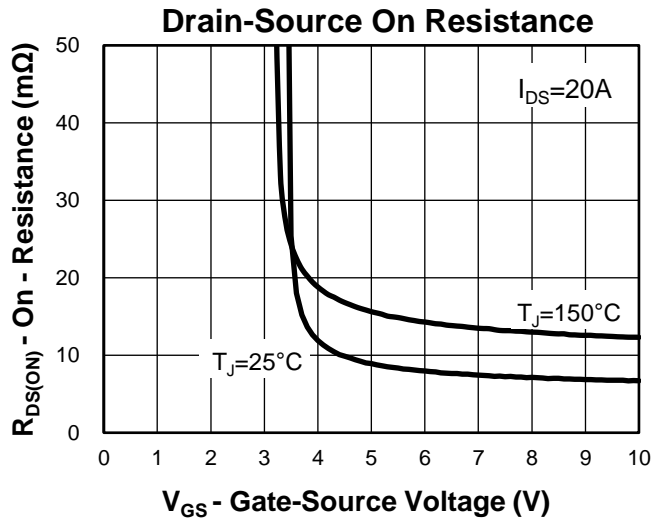
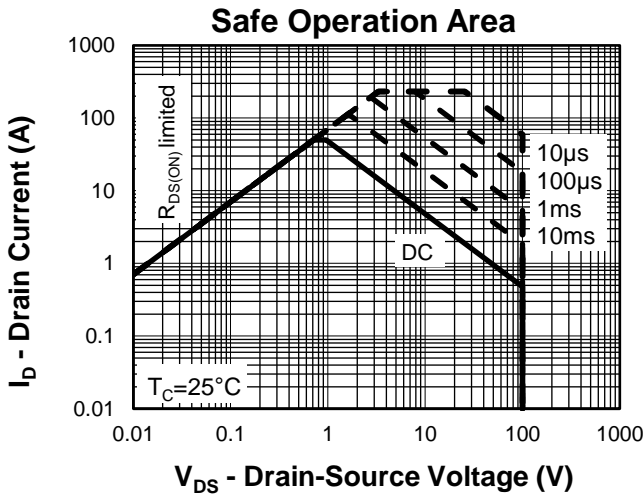
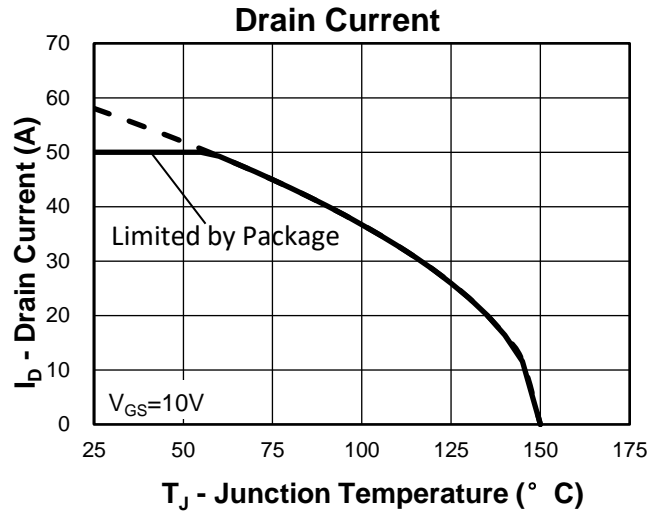
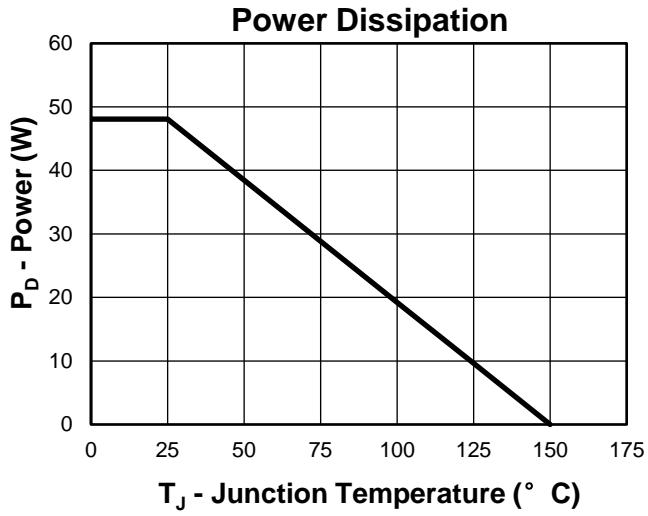


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

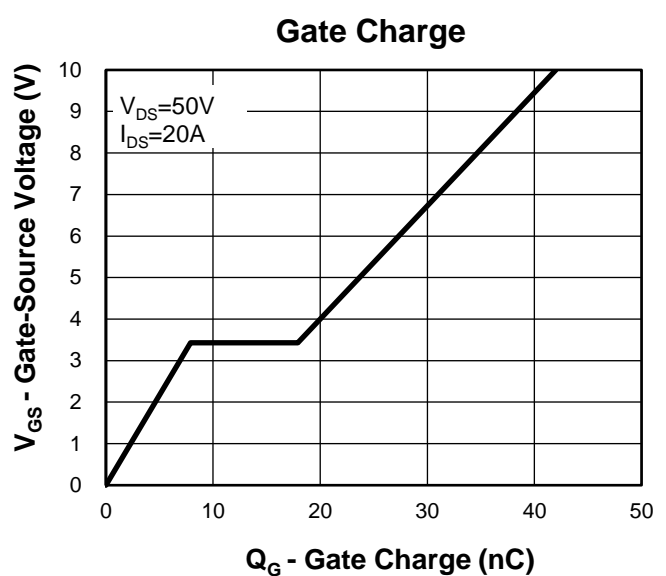
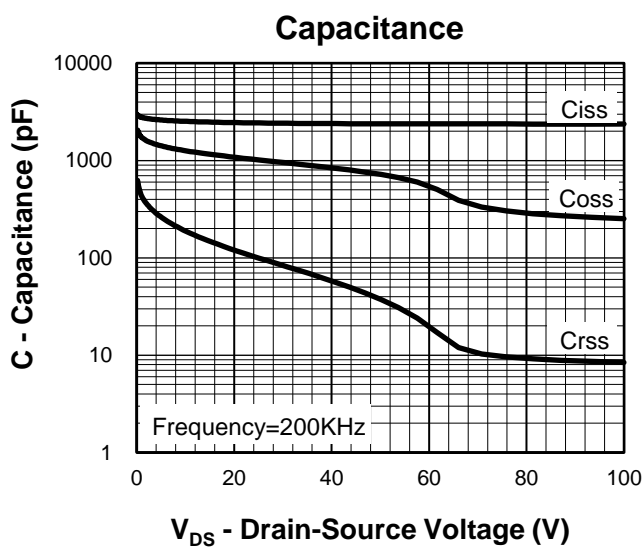
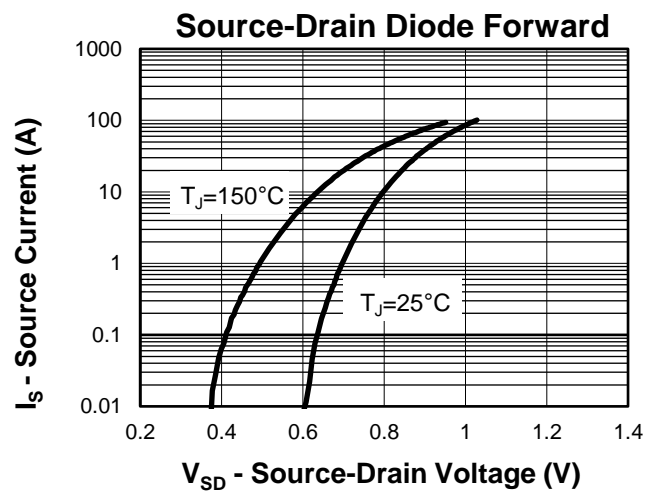
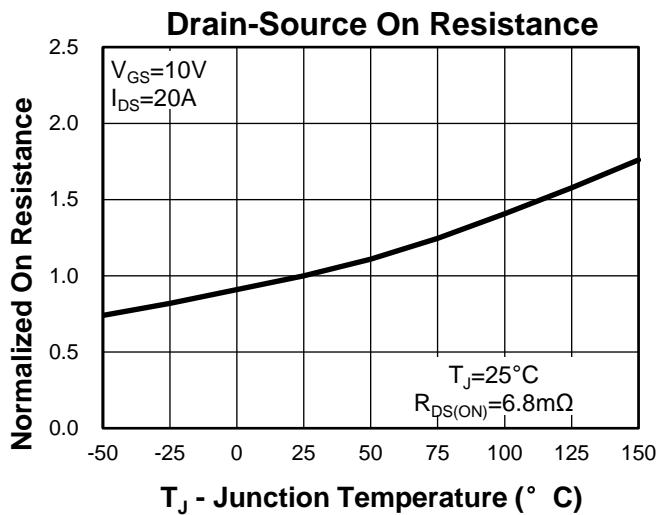
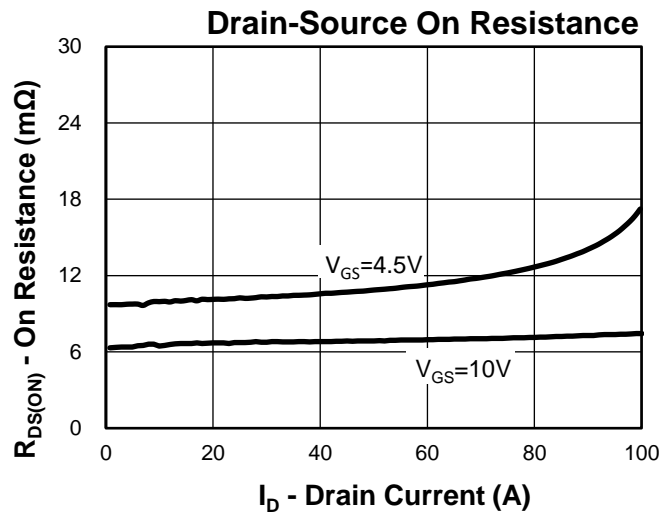
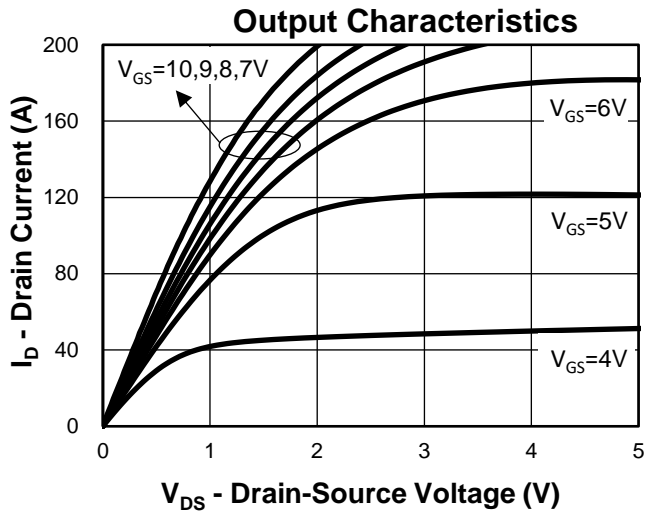
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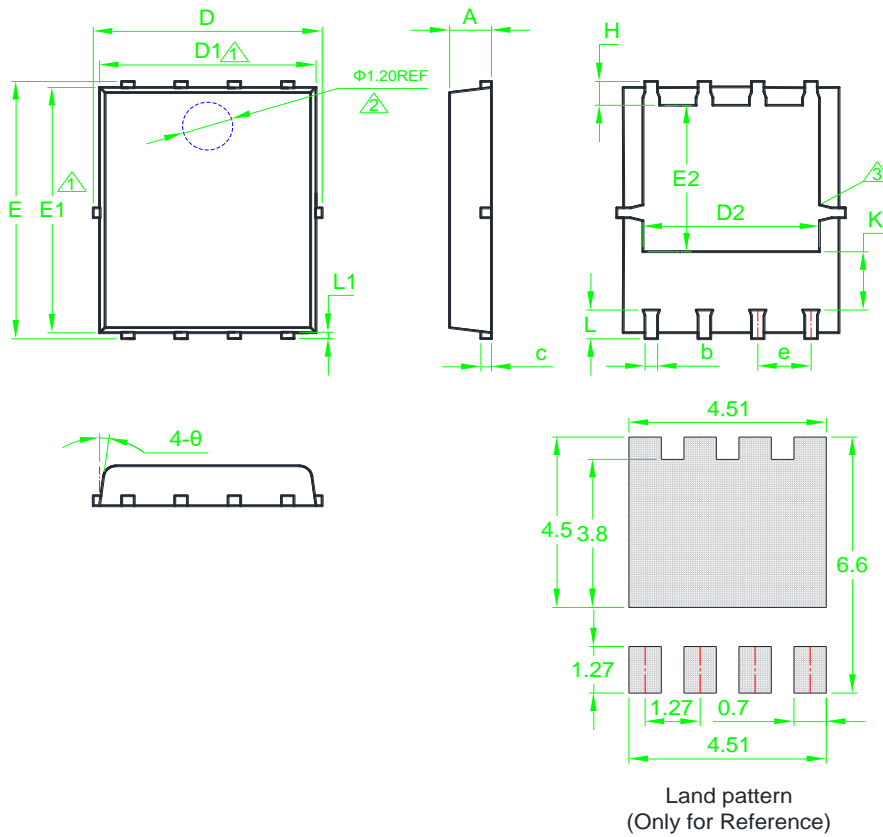
3rd Line: Lot Number(YWWXXX)

Typical Characteristics



Typical Characteristics



Package Information
PDFN5060


| SYMBOL | MM | | | INCH | | | SYMBOL | MM | | | INCH | | |
|--------|---------|------|------|----------|-------|-------|--------|---------|------|------|----------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX | | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.90 | 1.00 | 1.20 | 0.035 | 0.039 | 0.047 | E2 | 3.27 | 3.50 | 3.90 | 0.129 | 0.138 | 0.154 |
| b | 0.25 | * | 0.50 | 0.010 | * | 0.020 | e | 1.27BSC | | | 0.050BSC | | |
| c | 0.20 | 0.25 | 0.30 | 0.008 | 0.010 | 0.012 | H | 0.41 | 0.51 | 0.71 | 0.016 | 0.020 | 0.028 |
| D | 5.15BSC | | | 0.203BSC | | | K | 1.10 | 1.35 | 1.50 | 0.043 | 0.053 | 0.059 |
| D1 | 4.80 | 5.00 | 5.40 | 0.189 | 0.197 | 0.213 | L | 0.51 | 0.61 | 0.71 | 0.020 | 0.024 | 0.028 |
| D2 | 3.60 | * | 4.40 | 0.142 | * | 0.173 | L1 | 0.06 | 0.13 | 0.30 | 0.002 | 0.005 | 0.012 |
| E | 5.90 | 6.15 | 6.30 | 0.232 | 0.242 | 0.248 | θ | 0° | * | 12° | 0° | * | 12° |
| E1 | 5.40 | 5.80 | 5.95 | 0.213 | 0.228 | 0.234 | | | | | | | |

- ① Dimensions D1 and E1 do not include mold flash protrusions or gate burrs.
- ② The existence and size of demolding hole are variable depending on mold.
- ③ The size and shape of exposed pad are variable depending on mold.

Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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