

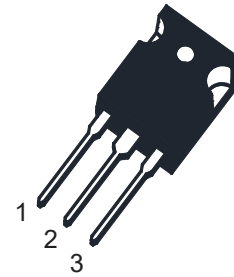
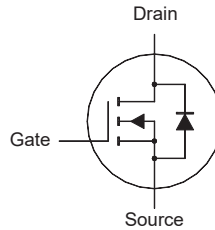
N-Channel Enhancement Mode MOSFET

Features

- Halogen and Antimony Free(HAF),
RoHS compliant

Application

- DC/DC Converters



1.Gate 2.Drain 3.Source
TO-247 Plastic Package

Key Parameters

Parameter	Value	Unit
BV_{DSS}	800	V
$R_{DS(ON)}$ Max	1150 @ $V_{GS} = 10\text{ V}$	m Ω
$V_{GS(th)}$ typ	3.1	V
Q_g typ	35.6 @ $V_{GS} = 10\text{ V}$	nC

Absolute Maximum Ratings(at $T_a = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	800	V
Gate-Source Voltage	V_{GS}	± 30	V
Drain Current	I_D	$T_c = 25^\circ\text{C}$ $T_c = 100^\circ\text{C}$	 A
Peak Drain Current, Pulsed ¹⁾	I_{DM}	21	A
Avalanche Current	I_{AS}	3.5	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	183	mJ
Power Dissipation	P_D	208.3	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.6	$^\circ\text{C/W}$
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	45	$^\circ\text{C/W}$

¹⁾ Pulse Test: Pulse Width $\leq 100\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$, Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.

²⁾ Limited by $T_{J(MAX)}$, starting $T_J = 25^\circ\text{C}$, $L = 30\text{ mH}$, $R_g = 25\text{ }\Omega$, $I_{AS} = 3.5\text{ A}$, $V_{GS} = 10\text{ V}$.

Characteristics at T_a = 25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at I _D = 250 μA	BV _{DSS}	800	-	-	V
Drain-Source Leakage Current at V _{DS} = 640 V	I _{DSS}	-	-	1	μA
Gate Leakage Current at V _{GS} = ± 24 V	I _{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at V _{DS} = V _{GS} , I _D = 250 μA	V _{GS(th)}	2	-	4	V
Drain-Source On-State Resistance at V _{GS} = 10 V, I _D = 5 A	R _{DS(on)}	-	-	1150	mΩ
DYNAMIC PARAMETERS					
Forward Transconductance at V _{DS} = 20 V, I _D = 5 A	g _{fs}	-	7.2	-	S
Gate Resistance at V _{GS} = 0 V, V _{DS} = 0 V, f = 1 MHz	R _g	-	4.6	-	Ω
Input Capacitance at V _{GS} = 0 V, V _{DS} = 400 V, f = 1 MHz	C _{iss}	-	1598	-	pF
Output Capacitance at V _{GS} = 0 V, V _{DS} = 400 V, f = 1 MHz	C _{oss}	-	41	-	pF
Reverse Transfer Capacitance at V _{GS} = 0 V, V _{DS} = 400 V, f = 1 MHz	C _{rss}	-	8	-	pF
Gate charge total at V _{DS} = 400 V, V _{GS} = 10 V, I _D = 10 A	Q _g	-	35.6	-	nC
Gate to Source Charge at V _{DS} = 400 V, V _{GS} = 10 V, I _D = 10 A	Q _{gs}	-	10	-	nC
Gate to Drain Charge at V _{DS} = 400 V, V _{GS} = 10 V, I _D = 10 A	Q _{gd}	-	12.6	-	nC
Turn-On Delay Time at V _{DS} = 400 V, V _{GS} = 10 V, I _D = 10 A, R _G = 24 Ω	t _{d(on)}	-	75	-	ns
Turn-On Rise Time at V _{DS} = 400 V, V _{GS} = 10 V, I _D = 10 A, R _G = 24 Ω	t _r	-	49	-	ns
Turn-Off Delay Time at V _{DS} = 400 V, V _{GS} = 10 V, I _D = 10 A, R _G = 24 Ω	t _{d(off)}	-	42	-	ns
Turn-Off Fall Time at V _{DS} = 400 V, V _{GS} = 10 V, I _D = 10 A, R _G = 24 Ω	t _f	-	34	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at I _S = 1 A, V _{GS} = 0 V	V _{SD}	-	-	1.4	V
Body-Diode Continuous Current	I _S	-	-	9	A
Body-Diode Continuous Current, Pulsed	I _{SM}	-	-	21	A
Body Diode Reverse Recovery Time at I _S = 10 A, di/dt = 100 A / μs	t _{rr}	-	691	-	ns
Body Diode Reverse Recovery Charge at I _S = 10 A, di/dt = 100 A / μs	Q _{rr}	-	7.1	-	μC

Electrical characteristic curves

Fig. 1 Typical Output Characteristics

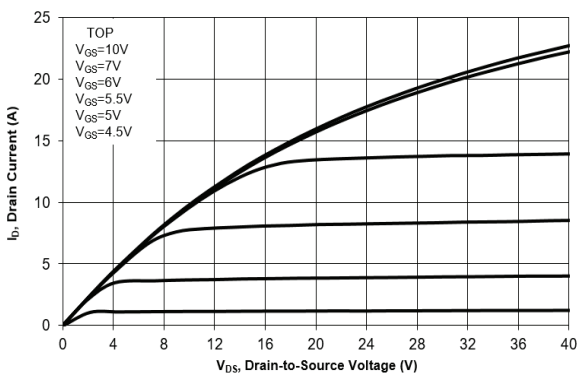


Fig. 2 Typical Transfer Characteristics

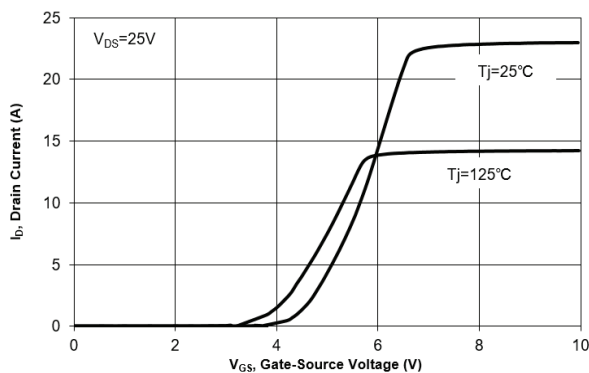


Fig. 3 On-Resistance vs. Drain Current

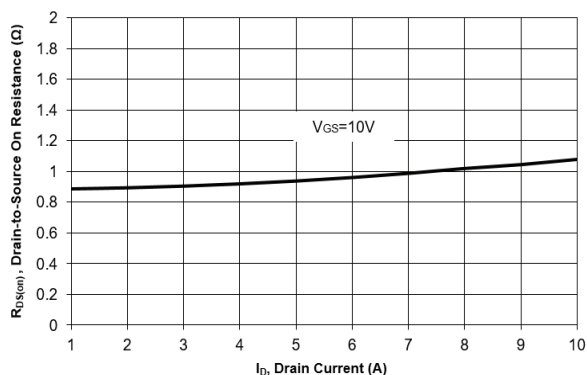


Fig. 4 On-Resistance vs. Gate to Source Voltage

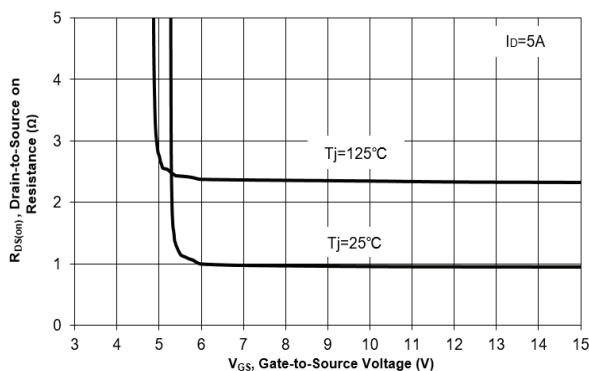


Fig. 5 On-Resistance vs. T_j

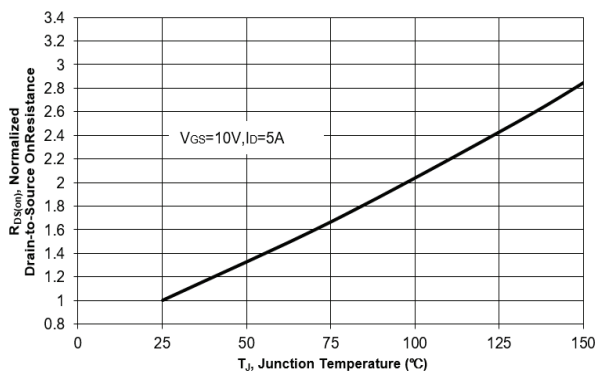


Fig. 6 Typical Body-Diode Forward Characteristics

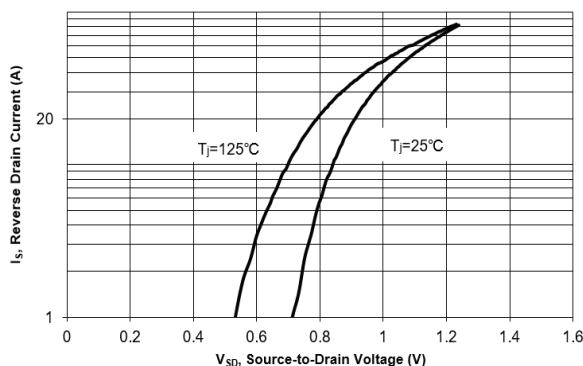


Fig. 7 Typical Junction Capacitance

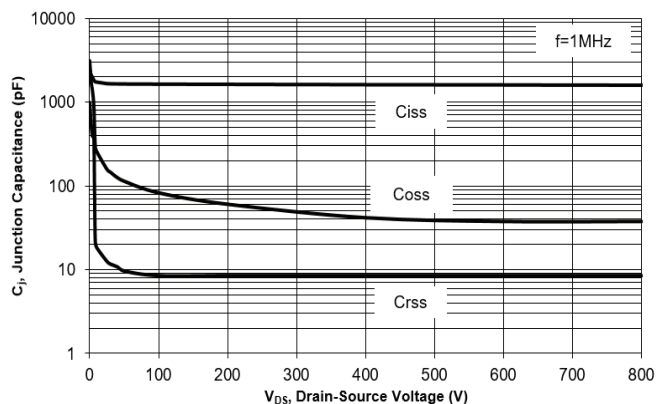


Fig. 8 Drain-Source Leakage Current vs. T_j

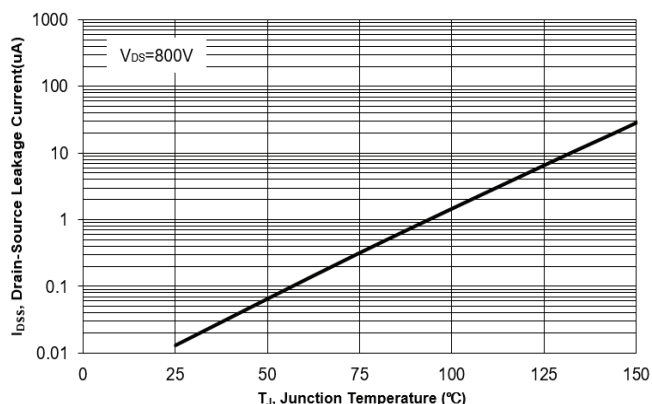


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

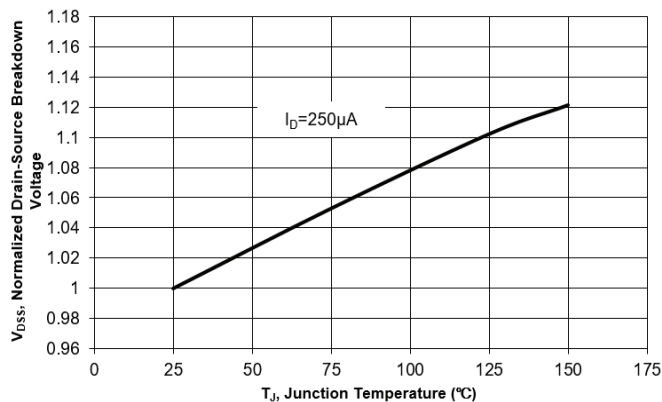


Fig. 10 Gate Threshold Variation vs. T_j

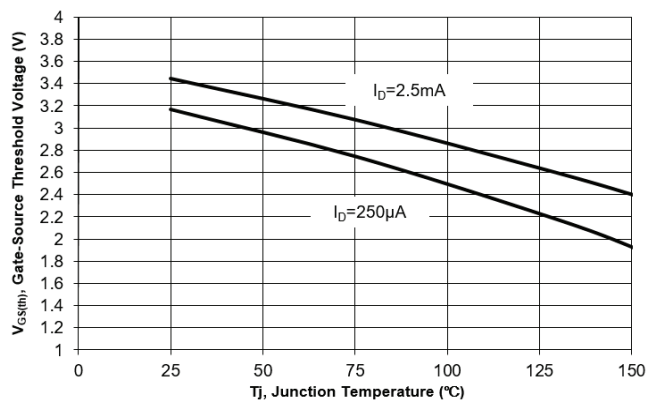


Fig. 11 Gate Charge

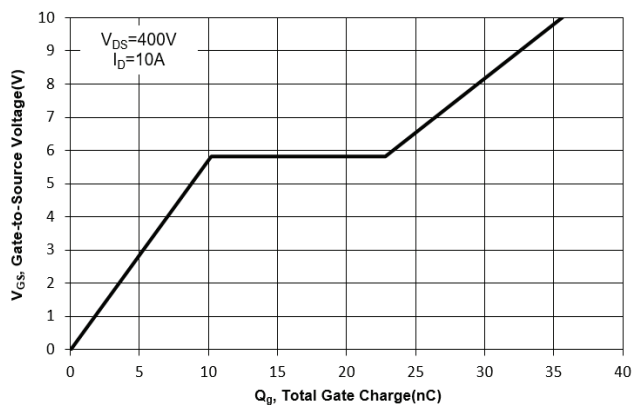
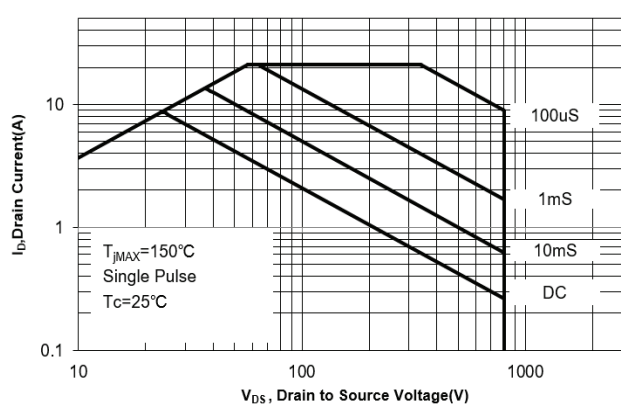


Fig. 12 Safe Operation Area



Electrical Characteristics Curves

Fig.13 Normalized Maximum Transient Thermal Impedance($Z_{\theta JC}$)

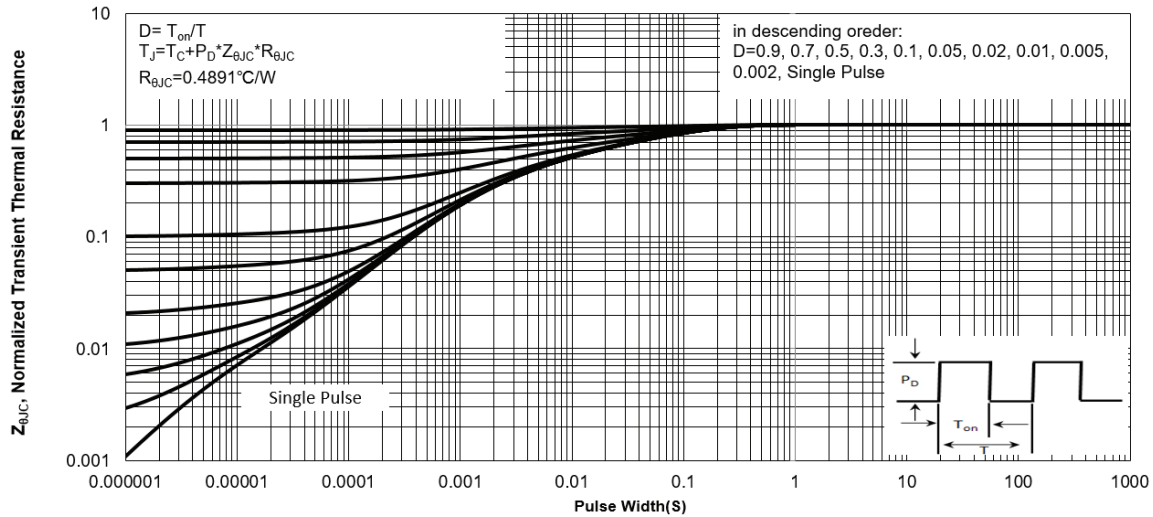
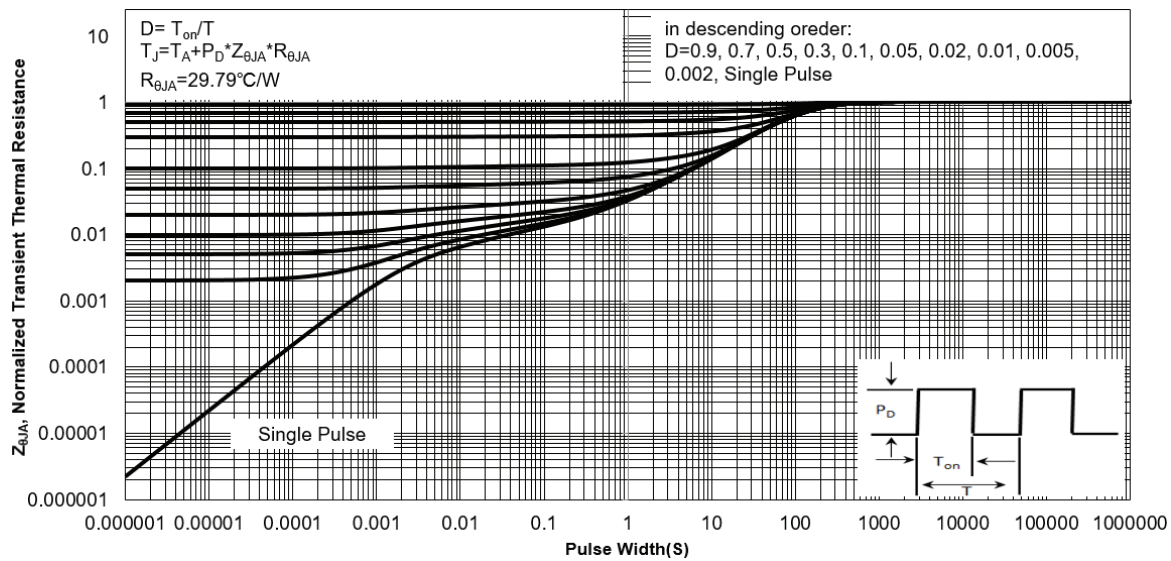
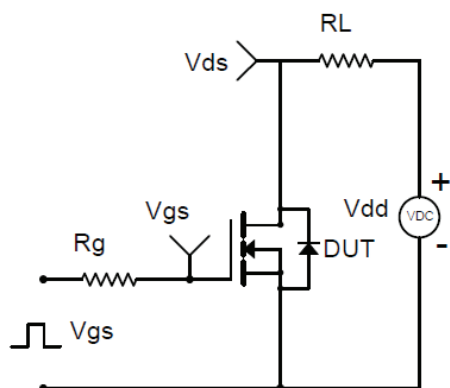
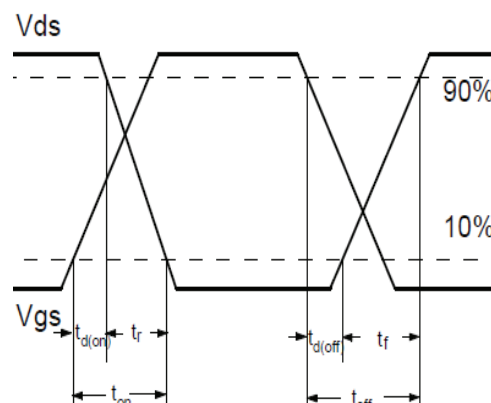
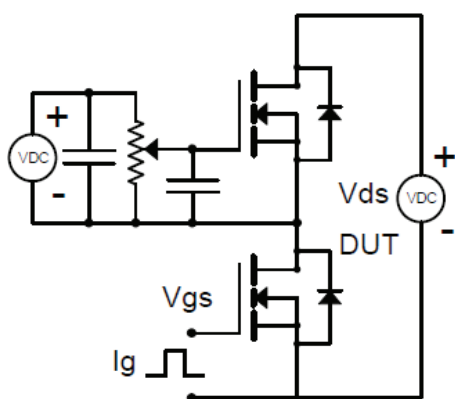
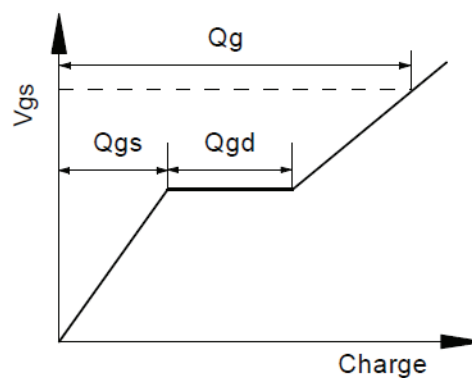
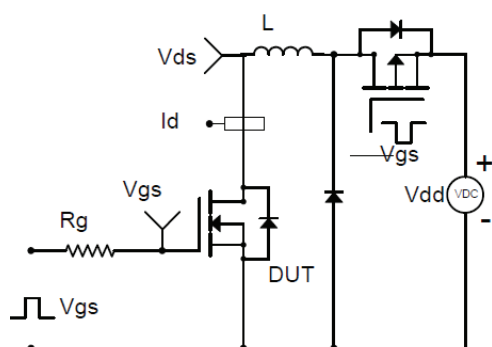
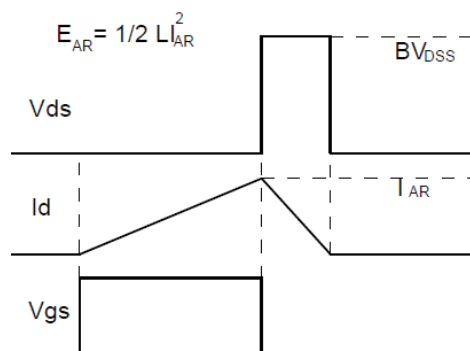


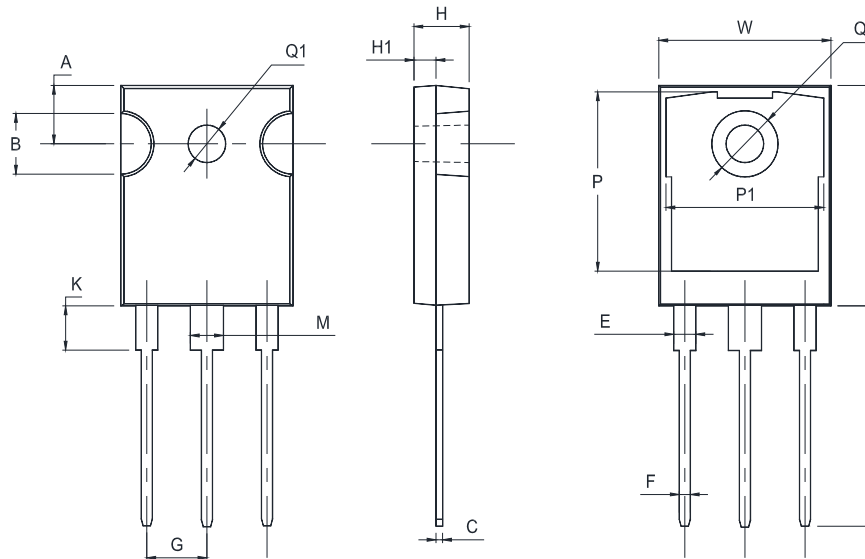
Fig.14 Normalized Maximum Transient Thermal Impedance($Z_{\theta JA}$)



Test Circuits
Fig.1-1 Switching times test circuit

Fig.1-2 Switching Waveform

Fig.2-1 Gate charge test circuit

Fig.2-2 Gate charge waveform

Fig.3-1 Avalanche test circuit

Fig.3-2 Avalanche waveform


Package Outline Dimensions (Units: mm)

TO-247



UNIT	A	B	C	D	E	F	G	W	H	H1	K	L	M	P
mm	6.5	5.2	0.7	20.3	2.2	1.3	5.7	16.2	5.3	2.4	4.45	21.3	3.2	16.6
	5.9	4.6	0.5	19.7	1.8	1.1	5.1	15.8	4.7	1.8	4.05	20.7	2.8	16.2

UNIT	P1	Q	Q1
mm	14.2	7.35	4.2
	13.8	7.05	3.6

Packing information

Package	Carton Quantity	Box Quantity	Base Quantity	Delivery Mode
TO-247	2.88 K / Carton	720 pcs / Box	30 pcs / Tube	Tube

Marking information

" LPT80N1K1 " = Part No
 " ***** " = Date Code Marking
 Font type: Arial



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