

1.Description

This benefit, combined with the fast switching speed and ruggedized device design that Power MOSFETs are well knownfor, provides the designerwith an extremely efficient device for use in a wide variety of applications.

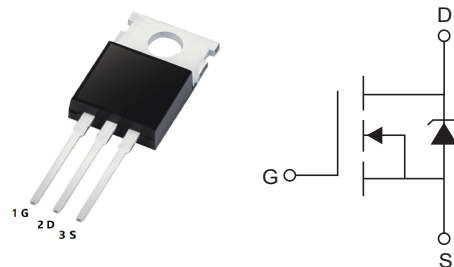
2.Features

- $V_{DS(V)}=55V$
- $I_D=47A$
- $R_{DS(ON)}<22m\Omega(V_{GS}=10V)$

2.Pinning information

Pin	Symbol	Description
1	G	GATE
2	D	DRAIN
3	S	SOURCE

TO-220



3.Absolute Maximum Ratings

Parameter		Symbol	Rating	Units
Continuous Drain Current, $V_{GS}=10V$	$T_C=25^{\circ}C$	I_D	47	A
Continuous Drain Current, $V_{GS}=10V$	$T_C=100^{\circ}C$		33	A
Pulsed Drain Current ①		I_{DM}	160	A
Power Dissipation	$T_C=25^{\circ}C$	P_D	110	W
Linear Derating Factor			0.71	W/ $^{\circ}C$
Gate-to-Source Voltage		V_{GS}	± 16	V
Single Pulse Avalanche Energy②		E_{AS}	210	mJ
Avalanche Current①		I_{AR}	25	A
Repetitive Avalanche Energy①		E_{AR}	11	mJ
Peak Diode Recovery dv/dt ③		dv/dt	5	V/ns
Storage Temperature Range		T_J, T_{STG}	-55 to 175	$^{\circ}C$
Soldering Temperature, for 10 seconds			300 (1.6mm from case)	$^{\circ}C$
Mounting torque,6-32 or M3 Screw			10 lbf.in (1.1N.m)	



4.Thermal resistance rating

Parameter	Symbol	Typ	Max	Units
Junction-to-Case	$R_{\theta JC}$		1.4	°C/W
CaSe-to-Sink, Flat, GreaSed Surface	$R_{\theta CS}$	0.5		°C/W
Junction-to-Ambient	$R_{\theta JA}$		62	°C/W



5. Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	55			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/T_J$	$I_D=1\text{mA}$, Reference to 25°C		0.07		$\text{V}/^\circ\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=25\text{A}$ ④			22	m Ω
		$V_{GS}=5\text{V}$, $I_D=25\text{A}$ ④			25	
		$V_{GS}=4\text{V}$, $I_D=21\text{A}$ ④			35	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1		2	V
Forward Transconductance	g_{FS}	$V_{DS}=25\text{V}$, $I_D=25\text{A}$	21			S
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=55\text{V}$, $V_{GS}=0\text{V}$			25	μA
		$V_{DS}=44\text{V}$, $V_{GS}=0\text{V}$, $T_J=150^\circ\text{C}$			250	
Gate-to-Source Forward Leakage	I_{GSS}	$V_{GS}=16\text{V}$			100	nA
Gate-to-Source Reverse Leakage		$V_{GS}=-16\text{V}$			-100	
Total Gate Charge	Q_g	$I_D=25\text{A}$			48	nC
Gate-to-Source Charge	Q_{gs}	$V_{DS}=44\text{V}$, $V_{GS}=5\text{V}$			8.6	
Gate-to-Drain ("Miller") Charge	Q_{gd}	See Fig. 6 and 13 ④			25	
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=28\text{V}$, $I_D=25\text{A}$ $R_G=3.4\Omega$, $V_{GS}=5\text{V}$ $R_D=1.1\Omega$, See Fig. 10 ④		11		ns
Rise Time	t_r			84		ns
Turn-Off Delay Time	$t_{D(off)}$			26		ns
Fall Time	t_f			15		ns
Internal Drain inductance	L_D	Between lead, 6mm (0.25in.) from package and center of die contact		4.5		nH
Internal Source inductance	L_S			7.5		
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$ $f = 1.0\text{MHz}$, See Fig. 5		1700		pF
Output Capacitance	C_{oss}			400		pF
Reverse Transfer Capacitance	C_{rss}			150		pF



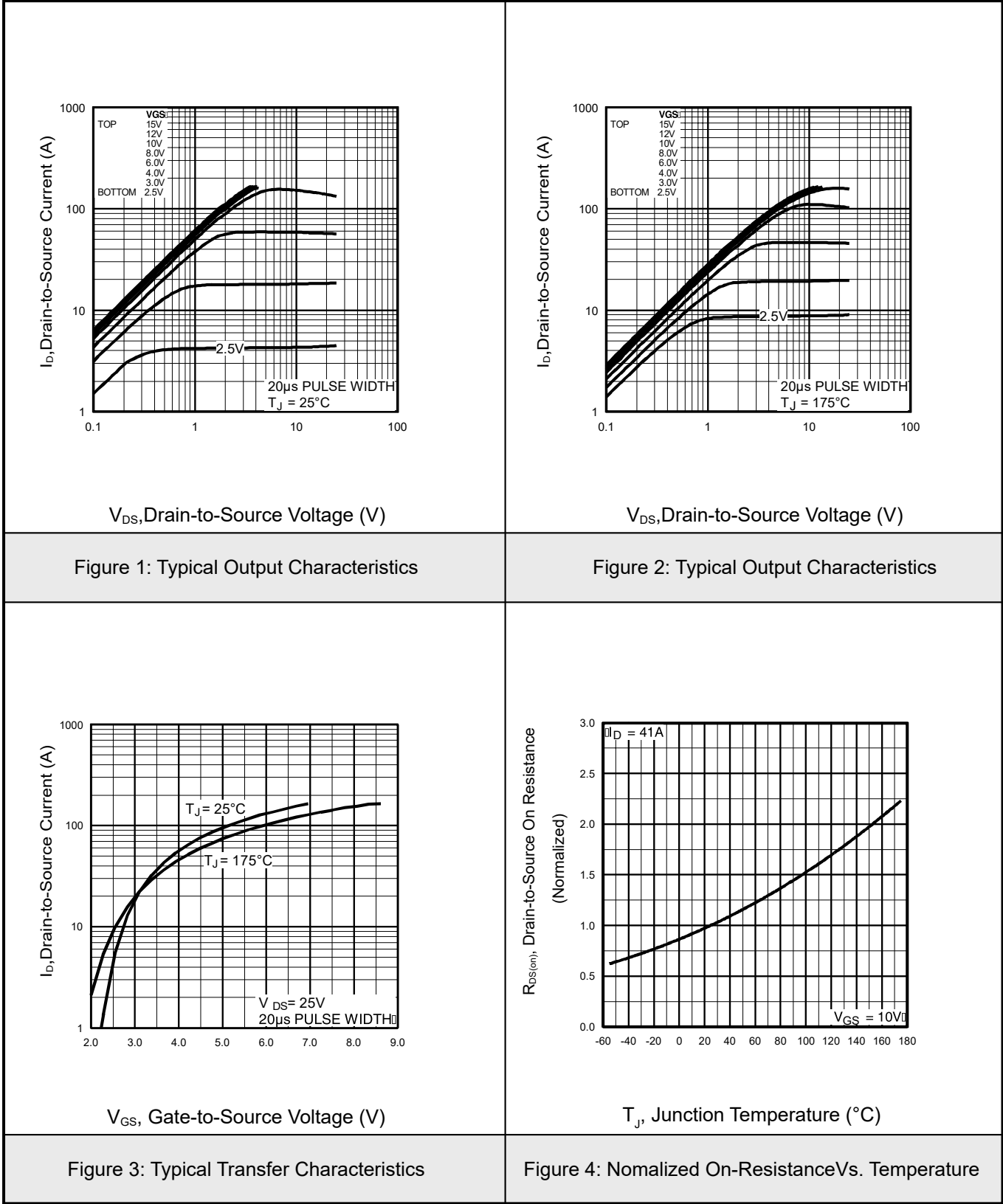
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			47	A
Pulsed Source Current (Body Diode) ①	I_{SM}				160	
Diode Forward Voltage	V_{SD}	$T_J=25^{\circ}\text{C}$, $I_S=25\text{A}$, $V_{GS}=0\text{V}$ ④			1.3	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}\text{C}$, $I_F=25\text{A}$		80	120	ns
Reverse Recovery Charge	Q_{rr}	$di/dt=100\text{A}/\mu\text{s}$ ④		210	320	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② $V_{DD}=25\text{V}$, starting $T_J=25^{\circ}\text{C}$, $L=470\mu\text{H}$, $R_G=25\Omega$, $I_{AS}=25\text{A}$. (See Figure 12)
- ③ $I_{SD} \leq 25\text{A}$, $di/dt \leq 270\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 175^{\circ}\text{C}$
- ④ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$

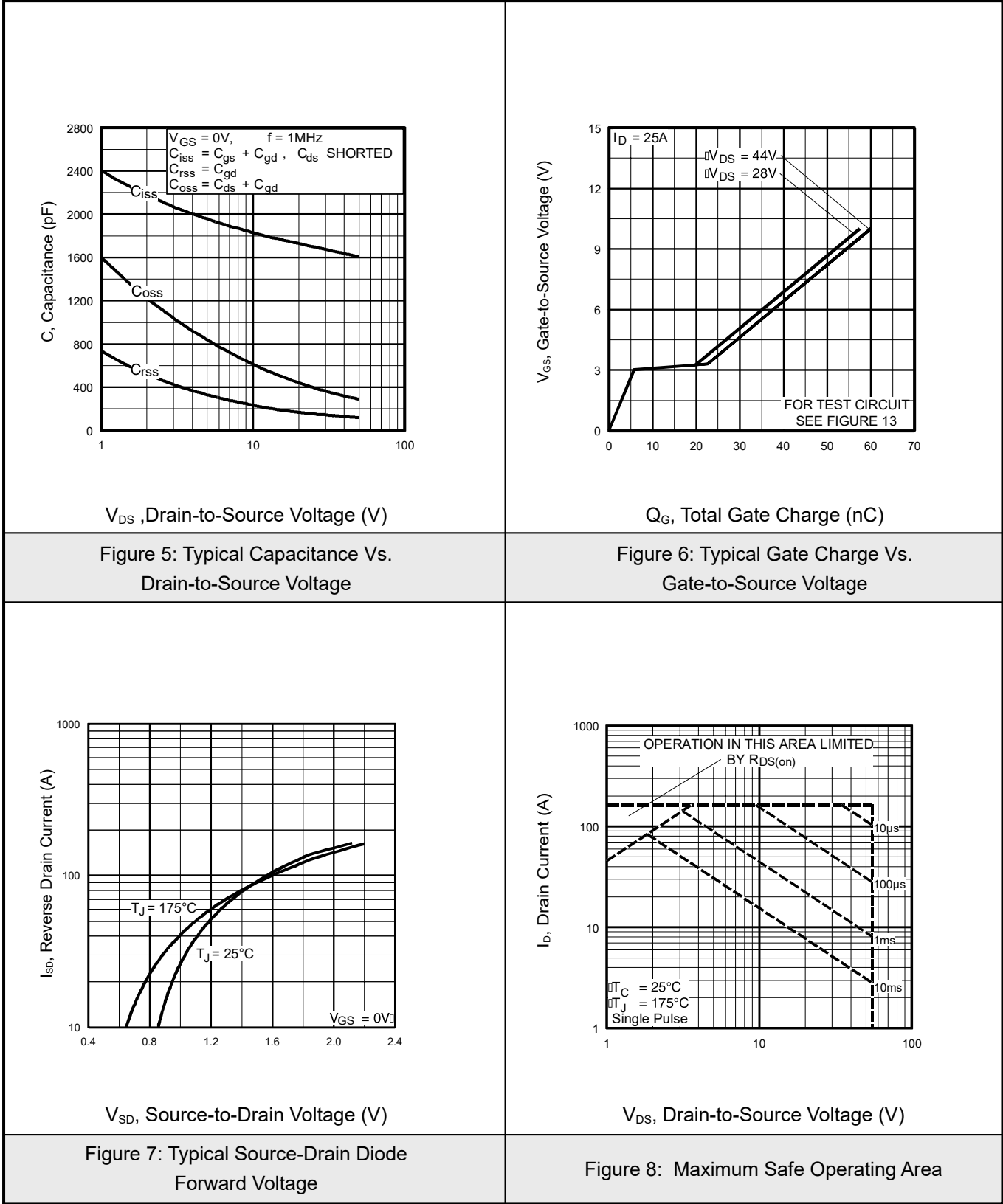


6.1 Typical Characteristics



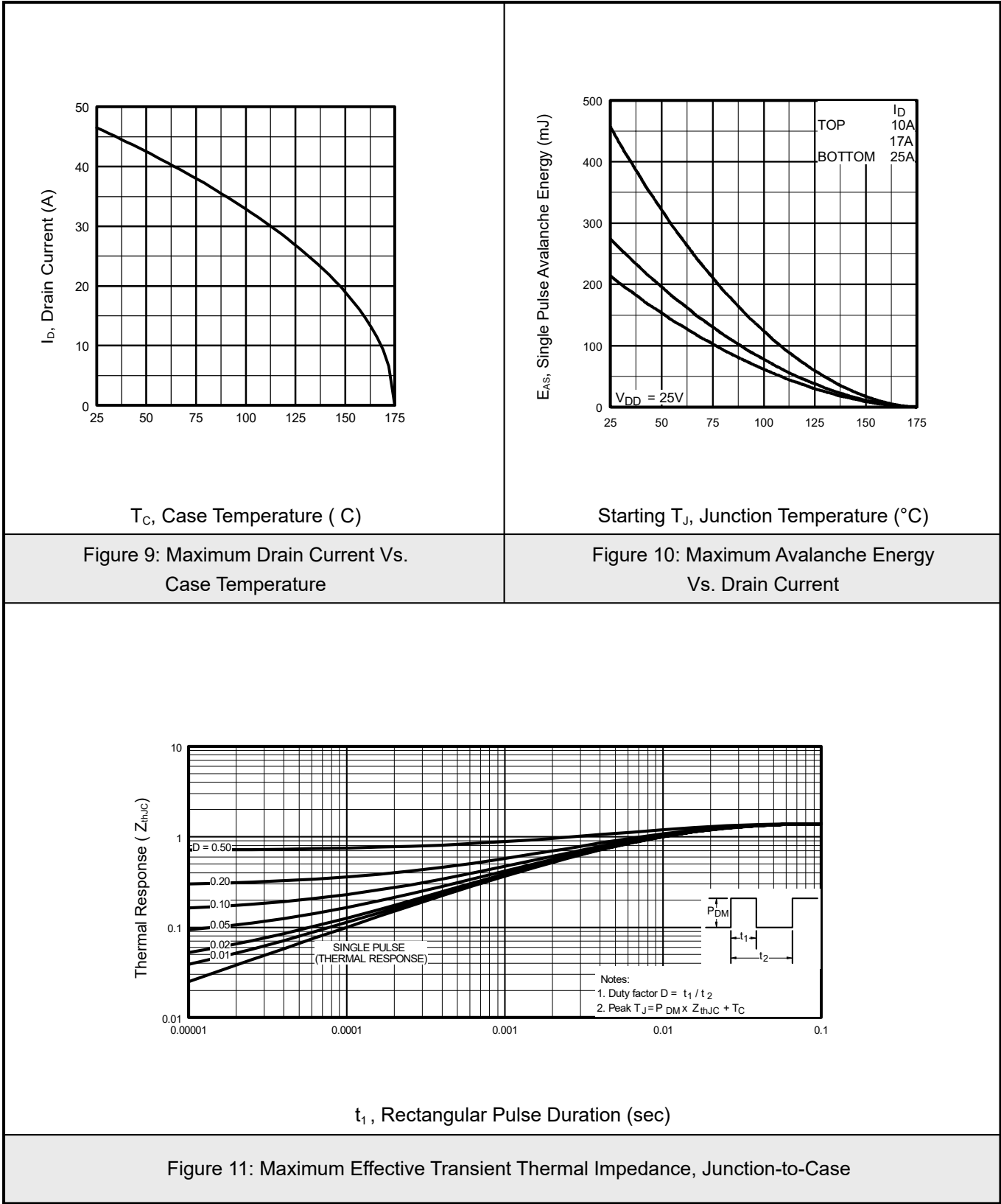


6.2Typical Characteristics





6.3Typical Characterisitics





6.4 Typical Characteristics

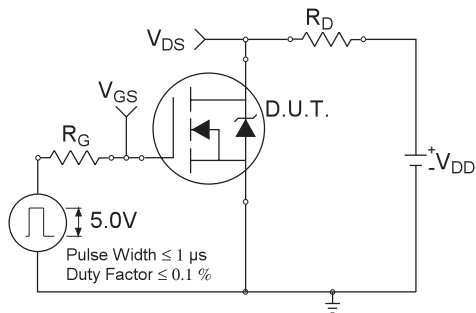


Figure 12a: Switching Time Test Circuit

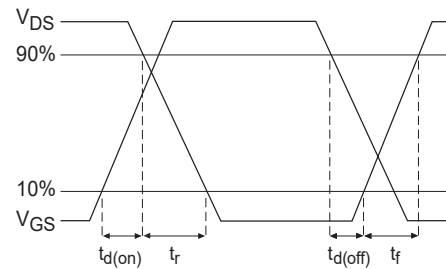


Figure 12b: Switching Time waveforms

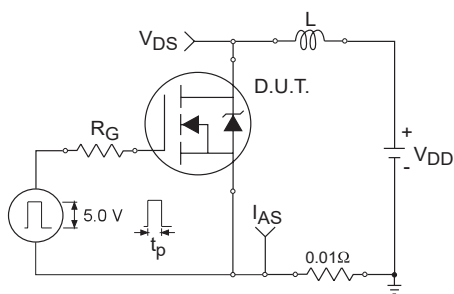


Figure 13a: Unclamped Inductive Test Circuit

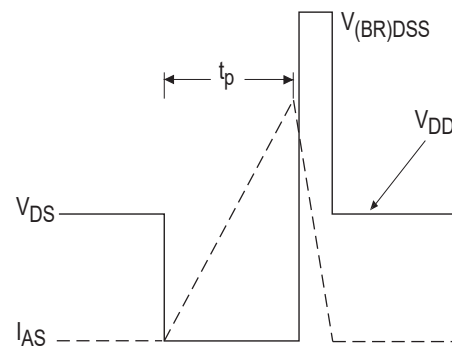


Figure 13b: Unclamped Inductive waveforms

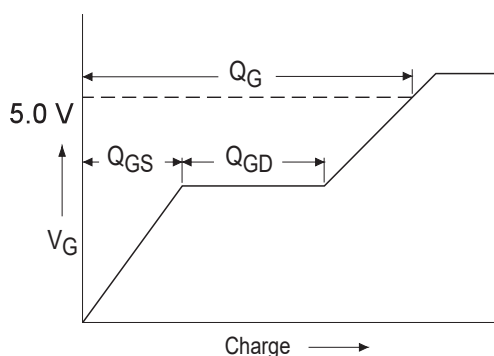


Figure 14a: Basic Gate Charge waveform

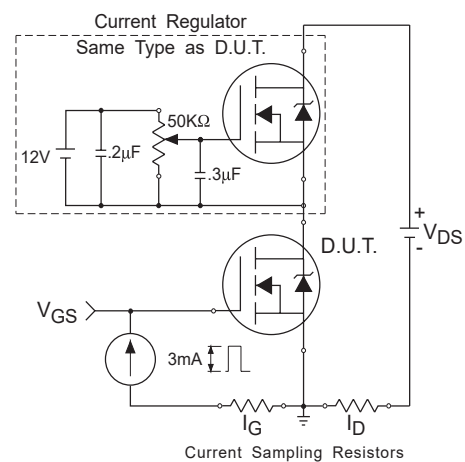
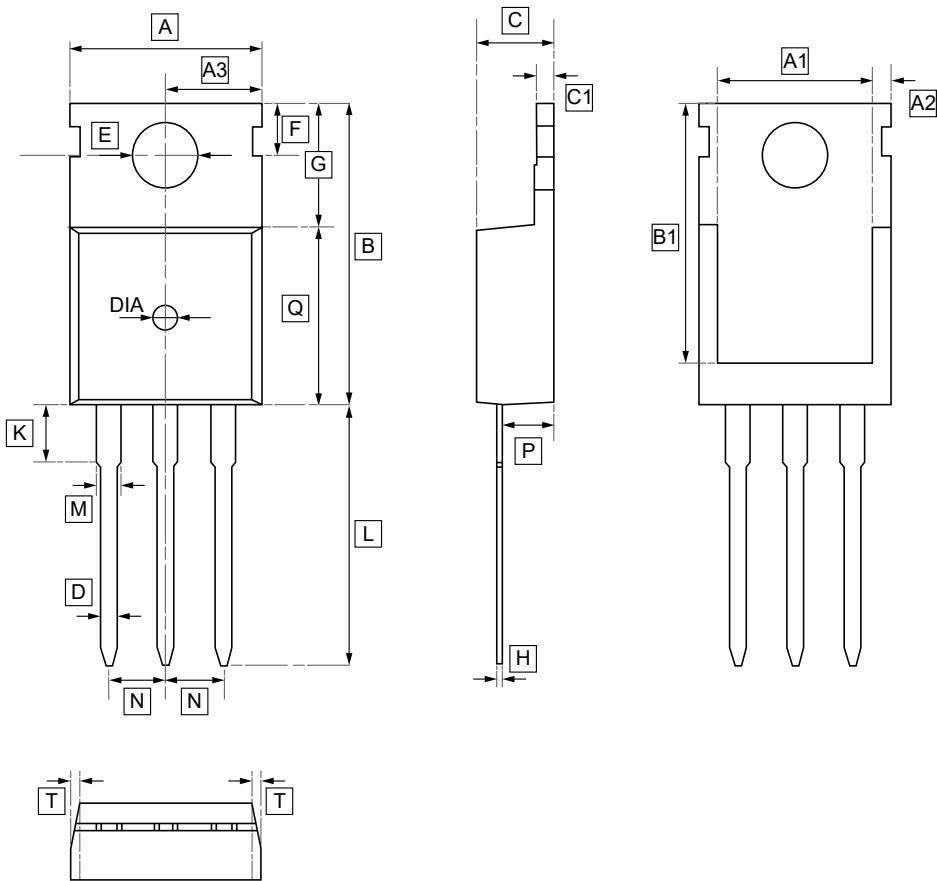


Figure 14b: Gate Charge Test Circuit



7.TO-220 Package Outline Dimensions



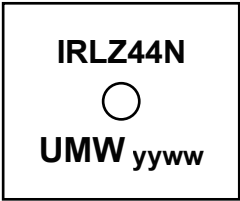
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	B	B1	C	C1	D	E	F	G
Min	9.7	8.44	1.05	4.8	15.4	12.9	4.28	1.1	0.6	3.4	2.65	5.2
Max	10.3	8.84	1.25	5.2	16.2	13.5	4.68	1.5	1.0	3.8	3.25	5.8

Symbol	H	K	L	L1	M	N	P	Q	T	DIA
Min	0.4	2.9	12.8	2.7	1.15	2.49	2.1	8.7	W:0.35	⌀1.5
Max	0.6	3.3	13.6	3.3	1.35	2.59	2.7	9.3		(deep 0.2)



8.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRLZ44N	TO-220	1000	Tube and box



9.Disclaimer

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