

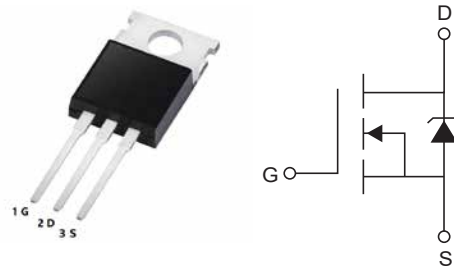
1.Features

- $V_{DS(V)}=30V$
- $ID=40A(V_{GS}=10V)$
- $R_{DS(ON)}<4.8m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<6.8m\Omega(V_{GS}=4.5V)$
- Very Low $R_{DS(ON)}$ at 4.5V V_{GS}
- Ultra-Low Gate Impedance
- Lead-Free
- Fully Characterized Avalanche Voltage and Current

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
Drain-to-Source Voltage		V_{DS}	30	V
Gate-to-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current, $V_{GS}=10V$ (Silicon Limited)	$T_C=25^{\circ}C$	I_D	92 ④	A
Continuous Drain Current, $V_{GS}=10V$ (Silicon Limited)	$T_C=100^{\circ}C$		65	A
Continuous Drain Current, $V_{GS}=10V$ (Package Limited)	$T_C=25^{\circ}C$		78	A
Pulsed Drain Current ①		I_{DM}	370	A
Maximum Power Dissipation ⑥	$T_C=25^{\circ}C$	P_D	75	W
Maximum Power Dissipation ⑥	$T_C=100^{\circ}C$		38	W
Linear Derating Factor			0.5	W/ $^{\circ}C$
Storage Temperature Range		T_J, T_{STG}	-55 to 175	$^{\circ}C$
Soldering Temperature, for 10 seconds (1.6mm from case)			300	$^{\circ}C$
Mounting torque, 6-32 or M3 screw			10lbin (1.1Nm)	



4.Thermal resistance rating

Parameter	Symbol	Typ	Max	Units
Junction-to-Case ⑥	$R_{\theta JC}$		2	°C/W
Case-to-Sink, Flat Greased Surface	$R_{\theta CS}$	0.5		°C/W
Junction-to-Ambient ⑤	$R_{\theta JA}$		62	°C/W



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

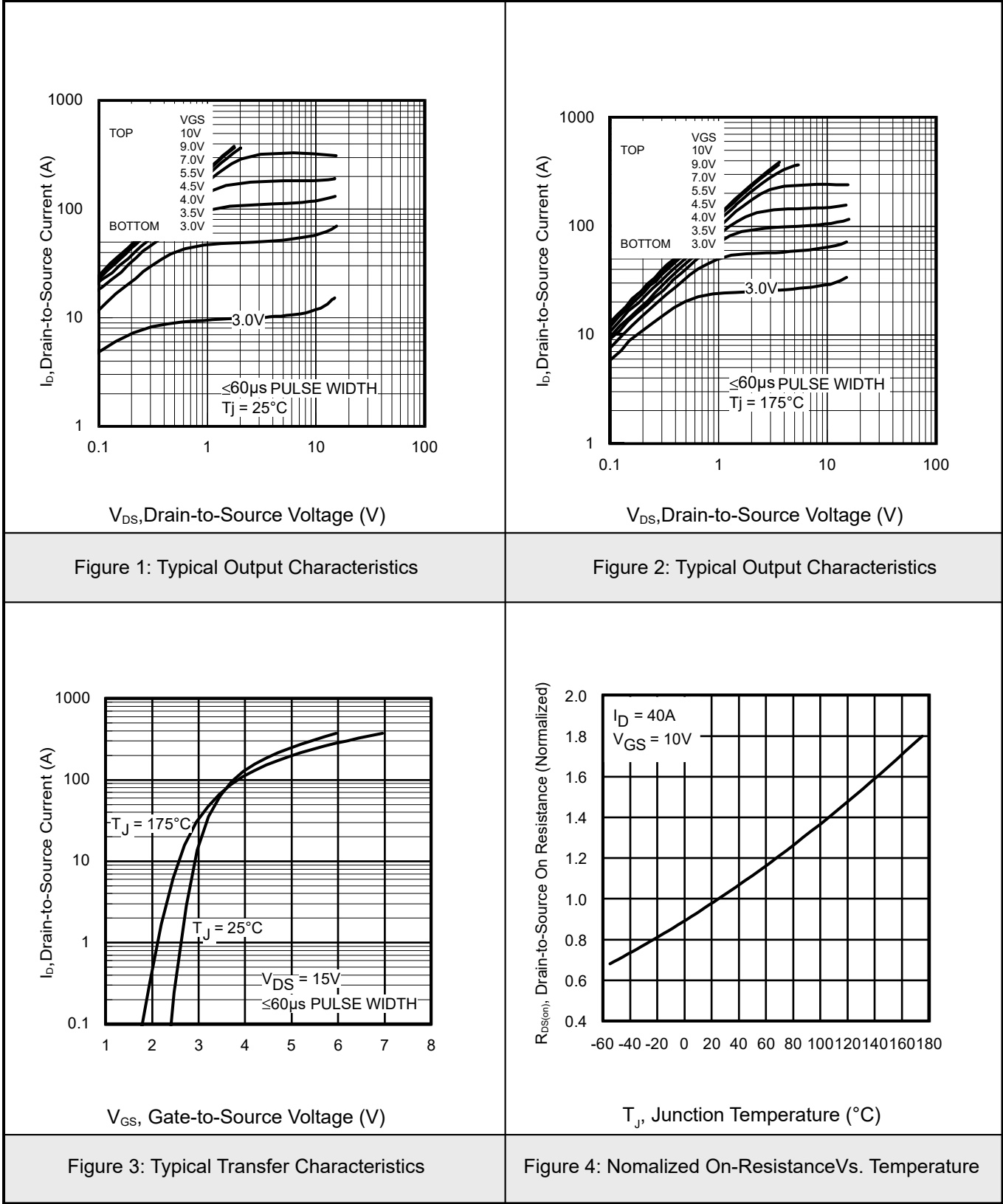
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
Breakdown Voltage Temp. Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=1\text{mA}$, Reference to 25°C		21		mV/ $^\circ\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=40\text{A}$ ③		3.8	4.8	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=32\text{A}$ ③		5.5	6.8	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=50\mu\text{A}$	1.35	1.8	2.35	V
Gate Threshold Voltage Coefficient	$\Delta V_{GS(th)}/\Delta T_J$			-7.1		mV/ $^\circ\text{C}$
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^\circ\text{C}$			150	μA
Gate-to-Source Forward Leakage	I_{GSS}	$V_{GS}=20\text{V}$			100	nA
Gate-to-Source Reverse Leakage		$V_{GS}=-20\text{V}$			-100	nA
Forward Transconductance	g_{FS}	$V_{DS}=15\text{V}$, $I_D=32\text{A}$	196			S
Total Gate Charge	Q_g	$V_{DS}=15\text{V}$, $V_{GS}=4.5\text{V}$ $I_D=32\text{A}$		15	23	nC
Pre-V _{th} Gate-to-Source Charge	Q_{gs1}			3.6		nC
Post-V _{th} Gate-to-Source Charge	Q_{gs2}			2.2		nC
Gate-to-Drain Charge	Q_{gd}			5.9		nC
Gate Charge Overdrive	Q_{gdor}			3.9		nC
Switch Charge ($Q_{gs2} + Q_{gd}$)	Q_{sw}			8.1		nC
Output Charge	Q_{oss}	$V_{DS}=16\text{V}$, $V_{GS}=0\text{V}$		11		nC
Gate Resistance	R_g			2	3.5	Ω
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=15\text{V}$, $V_{GS}=4.5\text{V}$ ③ $I_D=32\text{A}$, $R_G=1.8\Omega$		14		ns
Rise Time	t_r			96		ns
Turn-Off Delay Time	$t_{D(off)}$			16		ns
Fall Time	t_f			34		ns
Input Capacitance	C_{iss}	$V_{GS}=0$, $V_{DS}=15\text{V}$, $f=1.0\text{MHz}$		2139		pF
Output Capacitance	C_{oss}			464		pF
Reverse Transfer Capacitance	C_{rss}			199		pF



Avalanche Characteristics						
Single Pulse Avalanche Energy ②	E_{AS}				114	mJ
Avalanche Current ①	I_{AR}				32	A
Repetitive Avalanche Energy ①	E_{AR}				7.5	mJ
Diode Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			92④	A
Pulsed Source Current (Body Diode) ①	I_{SM}				370	A
Diode Forward Voltage	V_{SD}	$T_J=25^{\circ}\text{C}, I_S=32\text{A}, V_{GS}=0\text{V}$ ③			1	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}\text{C}, I_F=32\text{A}, V_{DD}=15\text{V}$		23	35	ns
Reverse Recovery Charge	Q_{rr}	$dI/dt=200\text{A}/\mu\text{s}$ ③		39	59	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

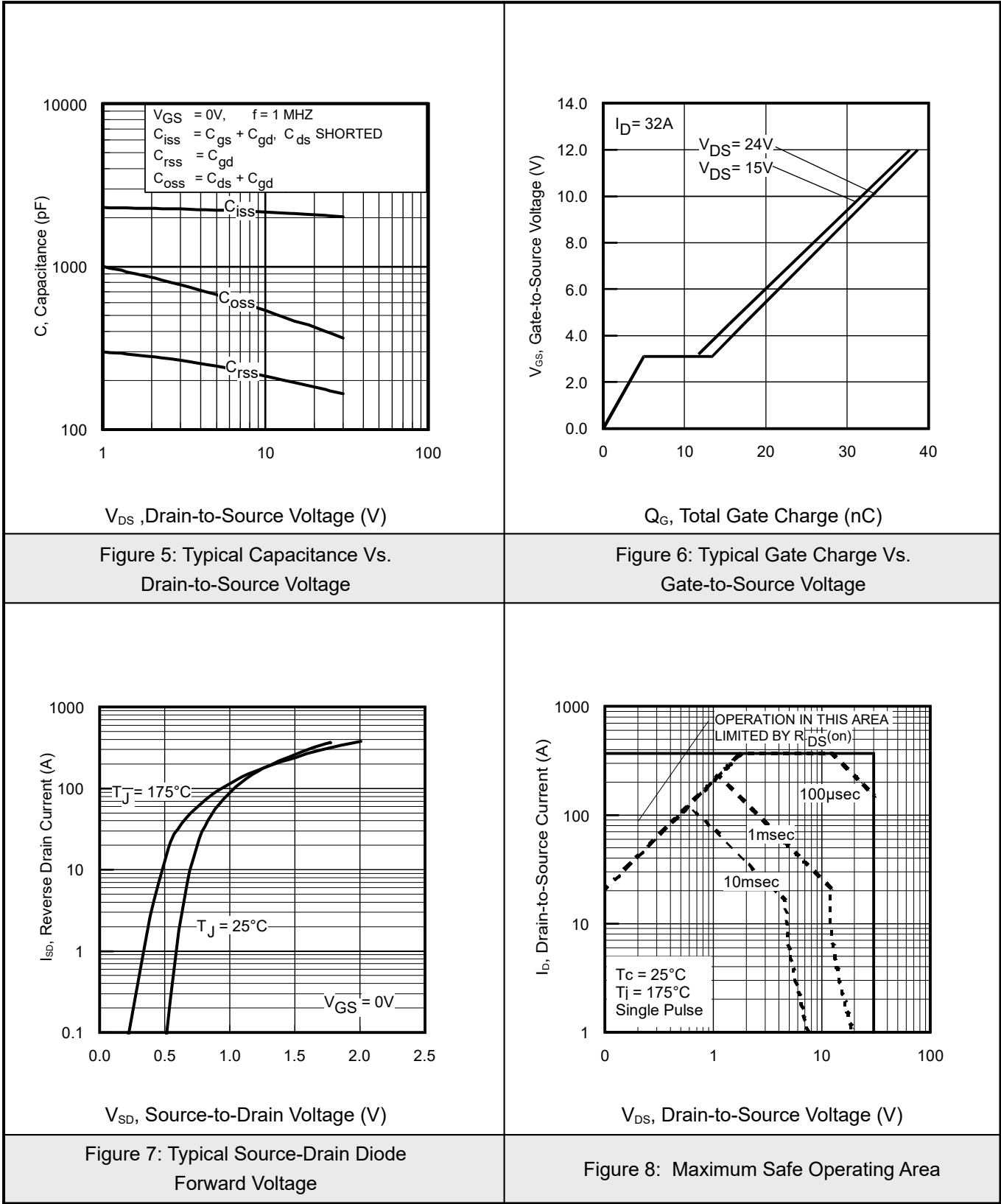


6.1 Typical Characteristics



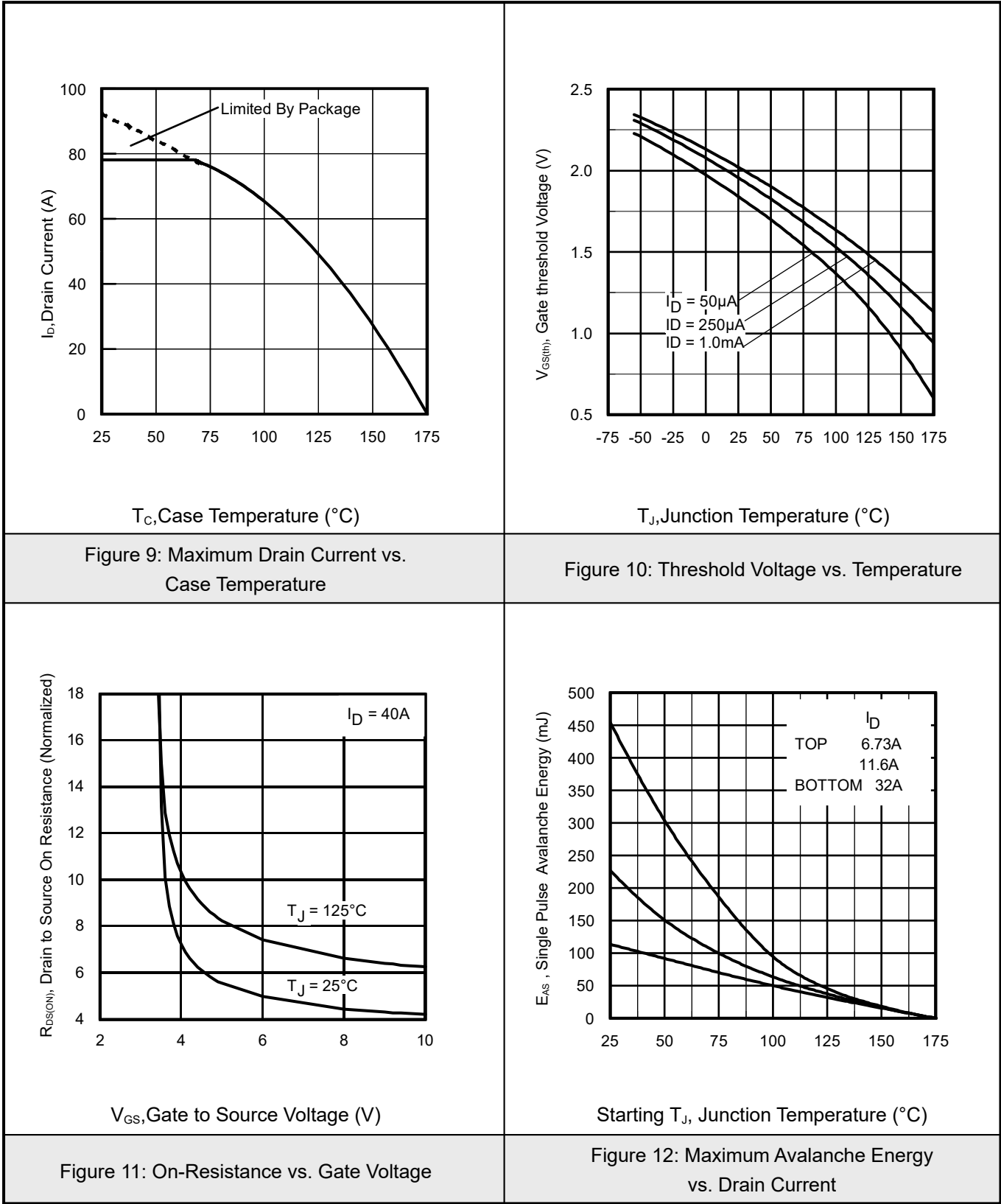


6.2Typical Characteristics





6.3 Typical Characteristics





6.4 Typical Characteristics

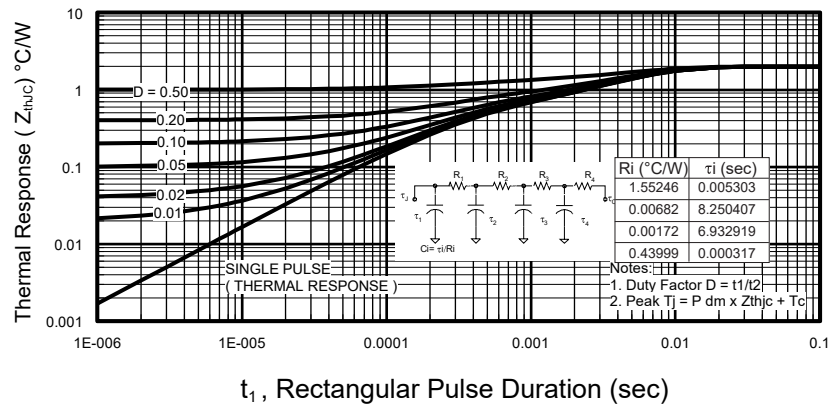


Figure 13: Maximum Effective Transient Thermal Impedance, Junction-to-Case

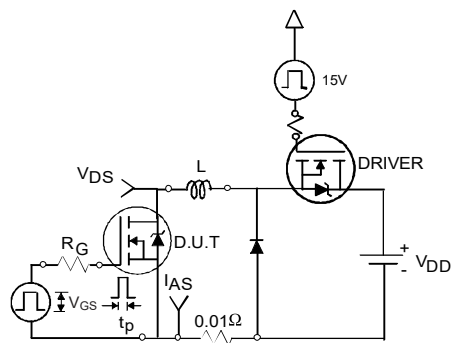


Figure 14a: Unclamped Inductive Test Circuit

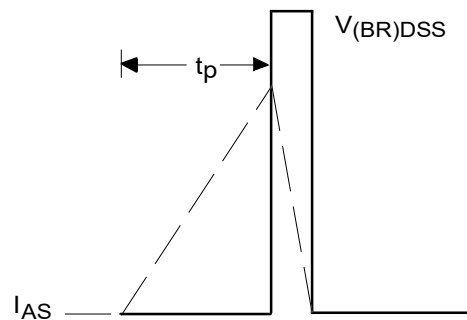


Figure 14b: Switching Time Test Circuit

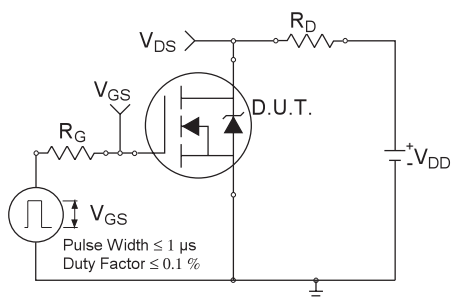


Figure 15a: Unclamped Inductive Waveforms

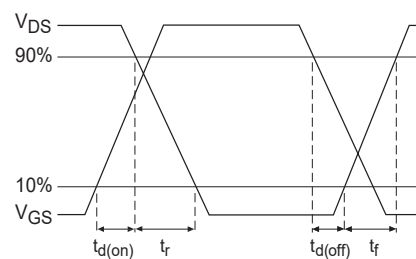
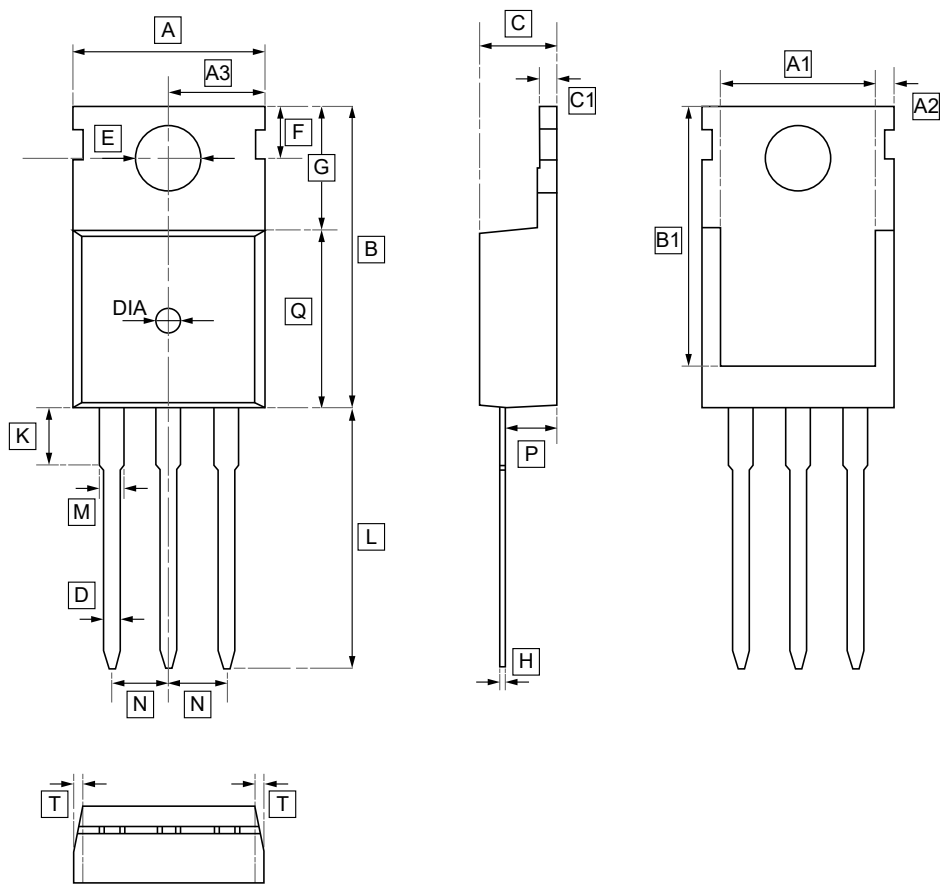


Figure 16b: Switching Time Waveforms



7.TO-220 Package Outline Dimensions



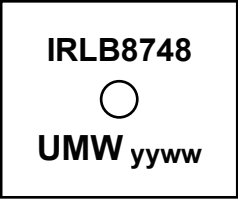
DIMENSIONS (mm are the original dimensions)

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 IRLB8748PBF	TO-220	1000	Tube and box



9.Disclaimer

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