

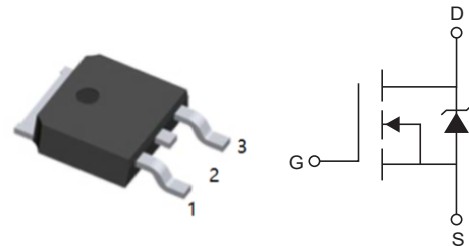
1.Features

- $V_{DS(V)} = 100V$
- $I_D = 10A$
- $R_{DS(ON)} < 185m\Omega (V_{GS} = 10V)$
- $R_{DS(ON)} < 225m\Omega (V_{GS} = 5V)$
- $R_{DS(ON)} < 265m\Omega (V_{GS} = 4V)$

2.Pinning information

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

TO-252(DPAK)
top view



3.Absolute Maximum Ratings

Parameter		Symbol	Rating	Units
Continuous Drain Current, $V_{GS} = 10V$	$T_C = 25^\circ C$	I_D	10	A
Continuous Drain Current, $V_{GS} = 10V$	$T_C = 100^\circ C$		7	A
Pulsed Drain Current ①⑥		I_{DM}	35	A
Power Dissipation	$T_C = 25^\circ C$	P_D	48	W
Linear Derating Factor			0.32	W/°C
Gate-to-Source Voltage		V_{GS}	± 16	V
Single Pulse Avalanche Energy ②⑥		E_{AS}	85	mJ
Avalanche Current ①⑥		I_{AR}	6	A
Repetitive Avalanche Energy ①⑥		E_{AR}	4.8	mJ
Peak Diode Recovery dv/dt ③		dv/dt	5	V/ns
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	°C
Soldering Temperature, for 10 seconds			300 (1.6mm from case)	°C



4.Thermal resistance rating

Parameter	Symbol	Typ	Max	Units
Junction-to-Case	$R_{\theta JC}$		3.1	°C/W
Junction-to-Ambient (PCB Mount) **	$R_{\theta JA}$		50	°C/W
Junction-to-Ambient	$R_{\theta JA}$		110	°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	$V_{(BR)DSS}$	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	100			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/T_J$	$I_D=1\text{mA}$, Reference to 25°C		0.12		$\text{V}/^\circ\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=6\text{A}$ ④			185	m Ω
		$V_{GS}=5\text{V}$, $I_D=6\text{A}$ ④			225	
		$V_{GS}=4\text{V}$, $I_D=5\text{A}$ ④			265	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1		2	V
Forward Transconductance	g_{FS}	$V_{DS}=25\text{V}$, $I_D=6\text{A}$ ⑥	3.1			S
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=100\text{V}$, $V_{GS}=0\text{V}$			25	μA
		$V_{DS}=80\text{V}$, $V_{GS}=0\text{V}$, $T_J=150^\circ\text{C}$			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	$I_D=6\text{A}$			20	nC
Gate-to-Source Charge	Q_{gs}	$V_{DS}=80\text{V}$, $V_{GS}=5\text{V}$			4.6	
Gate-to-Drain ("Miller") Charge	Q_{gd}	See Fig. 6 and 13 ④⑥			10	
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=50\text{V}$, $I_D=6\text{A}$ $R_G=11\Omega$, $V_{GS}=5\text{V}$ $R_D=8.2\Omega$, See Fig. 10 ④⑥		4		ns
Rise Time	t_r			35		ns
Turn-Off Delay Time	$t_{D(off)}$			23		ns
Fall Time	t_f			22		ns
Internal Drain inductance	L_D	Between lead, 6mm (0.25in.) from package and center of die contact⑤		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 ⑥		440		pF
Output Capacitance	C_{oss}			97		pF
Reverse Transfer Capacitance	C_{rss}			50		pF



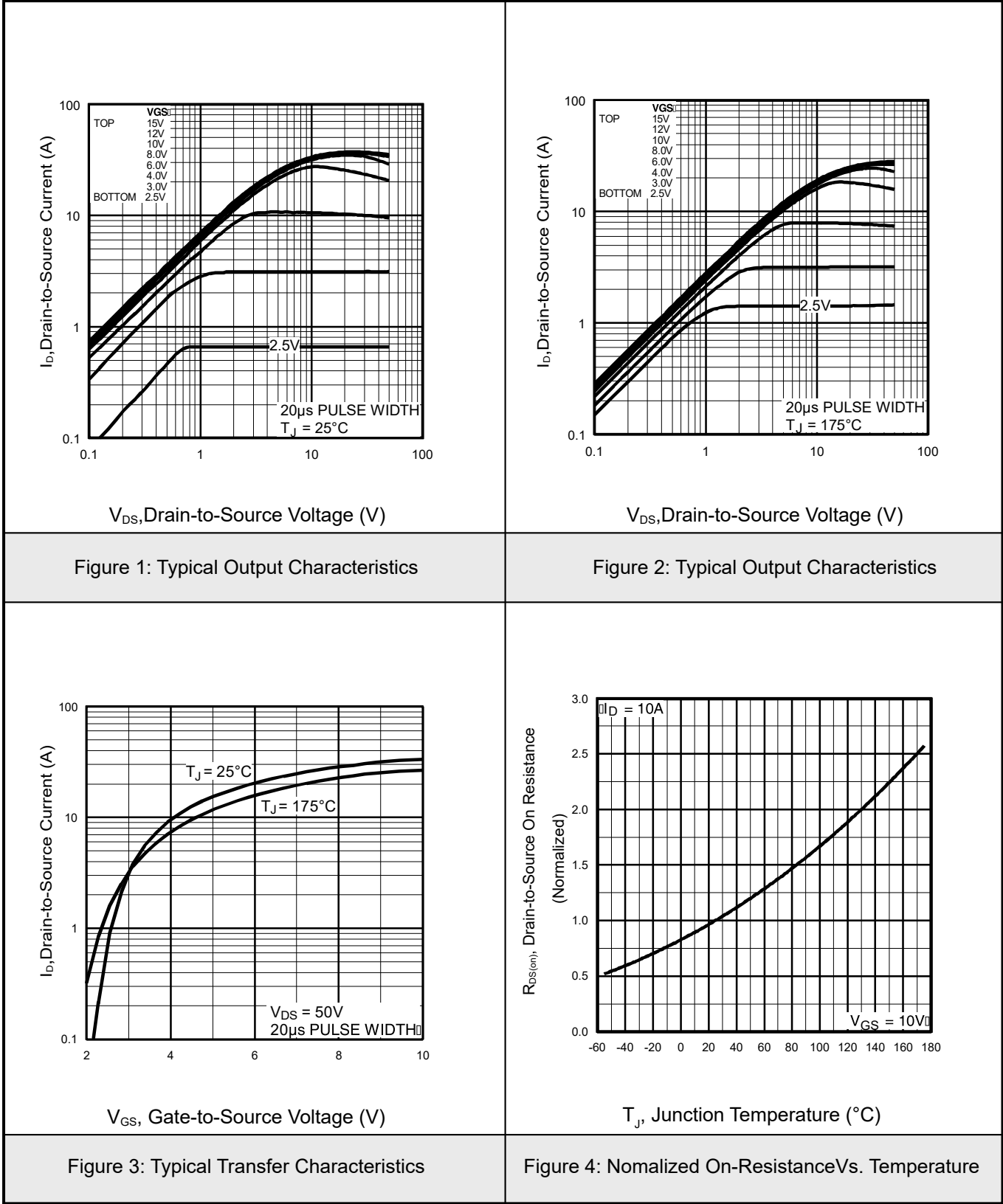
Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			10	A
Pulsed Source Current (Body Diode) ① ⑥	I_{SM}				35	
Diode Forward Voltage	V_{SD}	$T_J=25^{\circ}\text{C}$, $I_S=6\text{A}$, $V_{GS}=0\text{V}$ ④			1.3	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}\text{C}$, $I_F=6\text{A}$ $di/dt=100\text{A}/\mu\text{s}$ ④ ⑥		110	160	ns
Reverse Recovery Charge	Q_{rr}			410	620	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 $T_J=25^{\circ}\text{C}$, $L=4.7\text{mH}$
 $R_G=25\Omega$, $I_{AS}=6\text{A}$. (See Figure 12)
- ③ $I_{SD} \leq 6.0\text{A}$, $di/dt \leq 340\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 175^{\circ}\text{C}$
- ④ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$
- ⑤ Uses IRL530N data and test conditions.
- ⑥ This is applied for I-PAK, L_S of D-PAK is measured between lead and center of die contact.

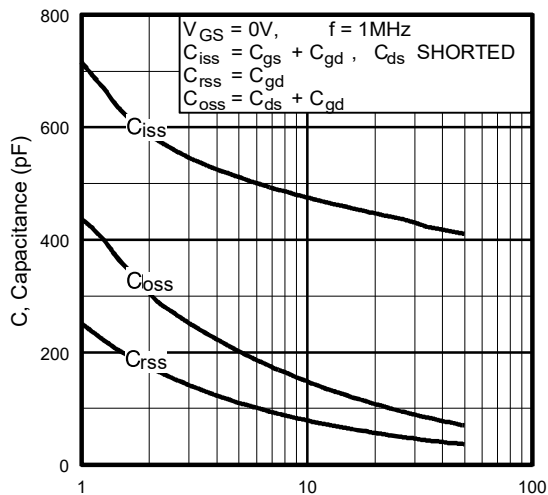


6.1 Typical Characteristics



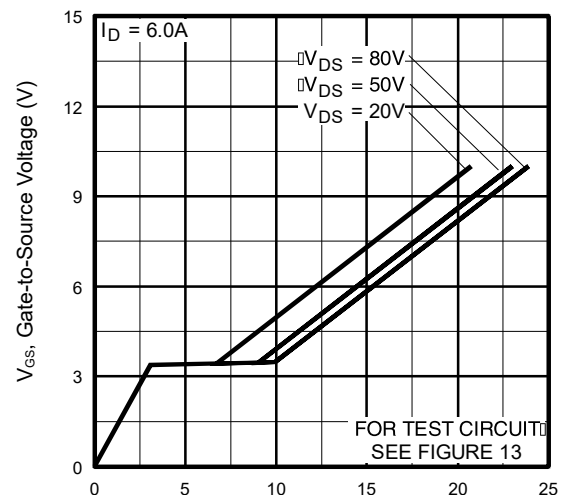


6.2 Typical Characteristics



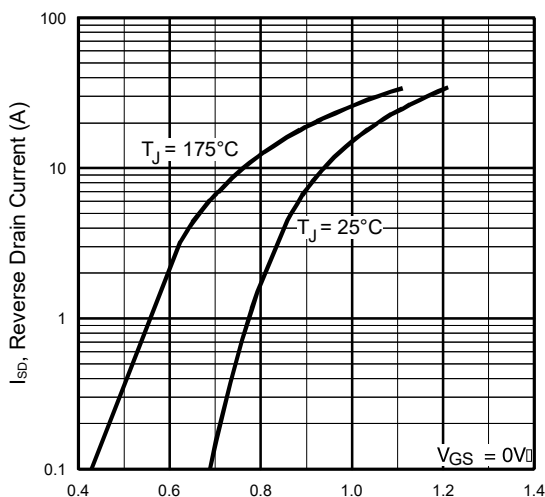
V_{DS} , Drain-to-Source Voltage (V)

Figure 5: Typical Capacitance Vs. Drain-to-Source Voltage



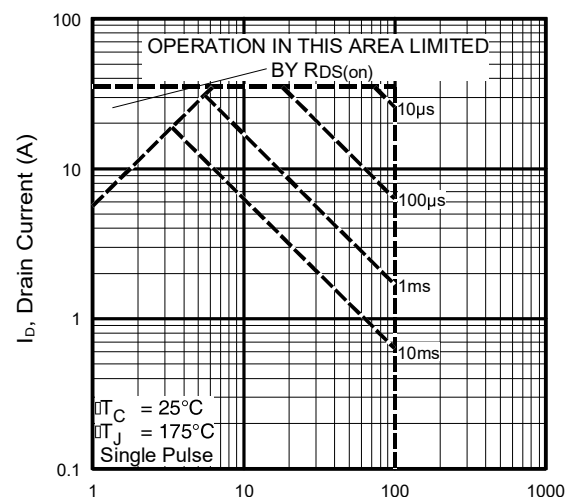
Q_G , Total Gate Charge (nC)

Figure 6: Typical Gate Charge Vs. Gate-to-Source Voltage



V_{SD} , Source-to-Drain Voltage (V)

Figure 7: Typical Source-Drain Diode Forward Voltage

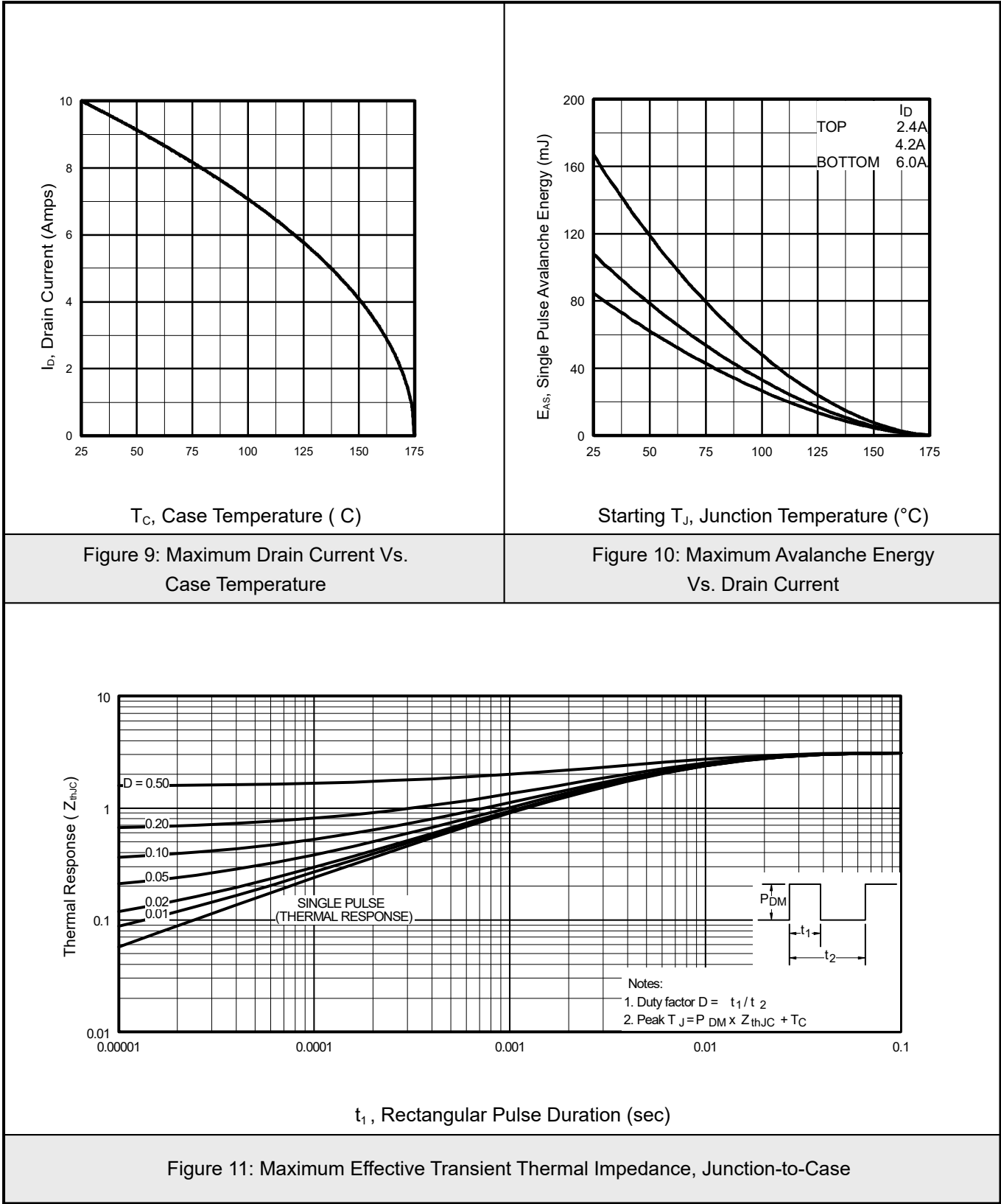


V_{DS} , Drain-to-Source Voltage (V)

Figure 8: Maximum Safe Operating Area



6.3Typical Characteristics





6.4 Typical Characteristics

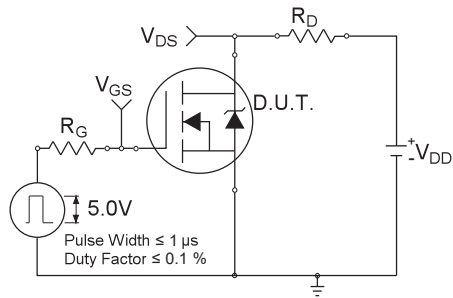


Figure 12a: Switching Time Test Circuit

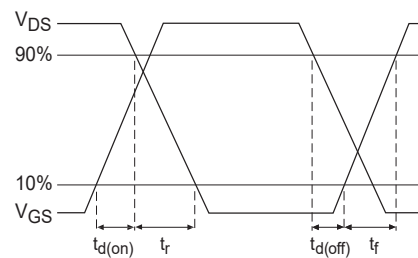


Figure 12b: Switching Time Waveforms

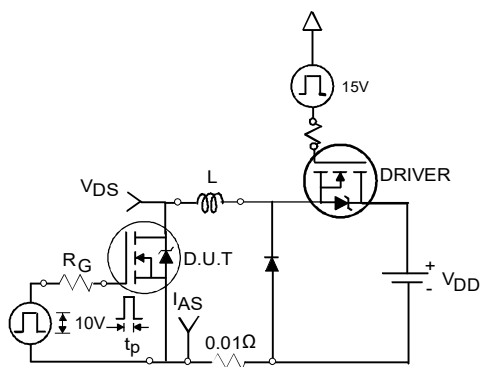


Figure 13a: Unclamped Inductive Test Circuit

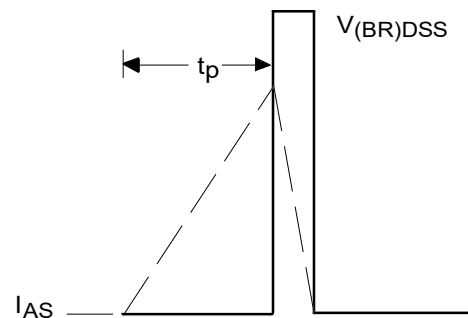


Figure 13b: Unclamped Inductive Waveforms

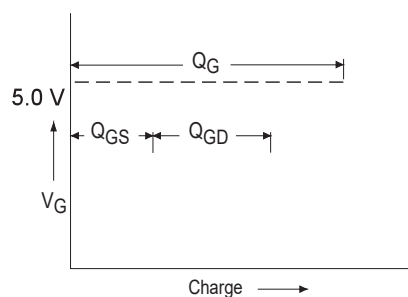


Figure 14a: Basic Gate Charge Waveform

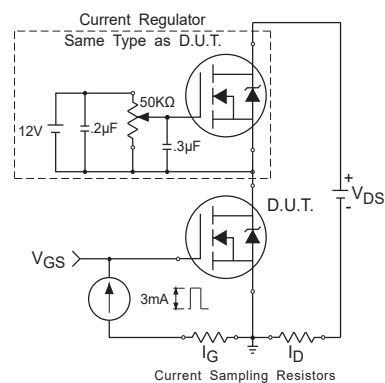
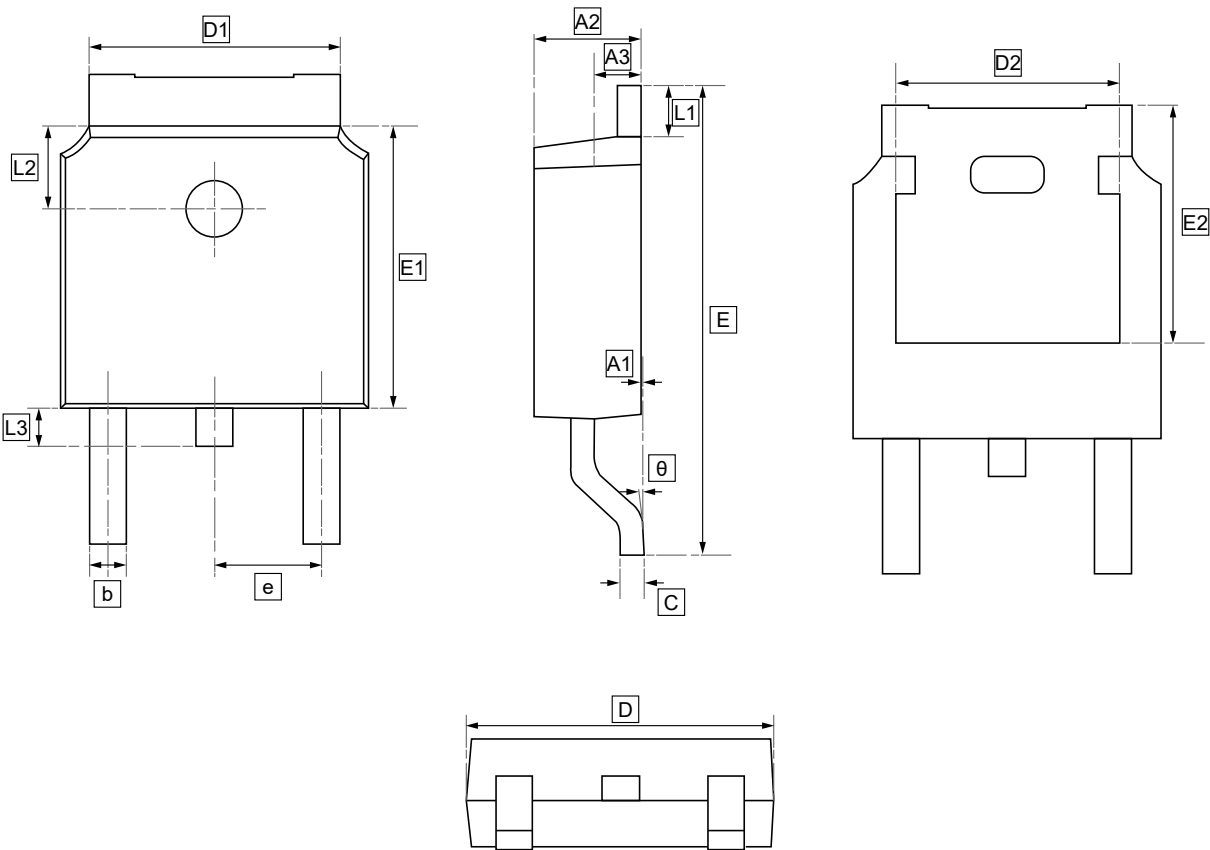


Figure 14b: Gate Charge Test Circuit



7.TO-252 Package Outline Dimensions

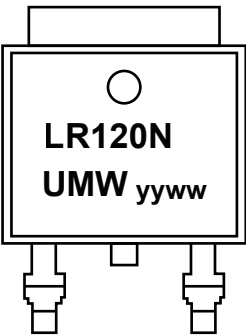


DIMENSIONS (mm are the original dimensions)

Symbol	A1	A2	A3	b	c	D	D1	D2	E	E1	E2	e	L1	L2	L3	θ
Min	0.00	2.18	0.90	0.65	0.46	6.35	4.95	4.32	9.40	5.97	5.21	2.286 BSC	0.89	1.70	0.60	0.00
Max	0.13	2.39	1.10	0.85	0.61	6.73	5.46	4.90	10.41	6.22	5.38		1.27	1.90	1.00	8.00



8.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRLR120NTR	TO-252	2500	Tape and reel



9.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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