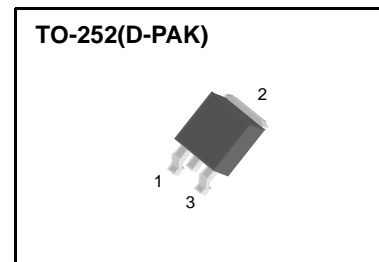
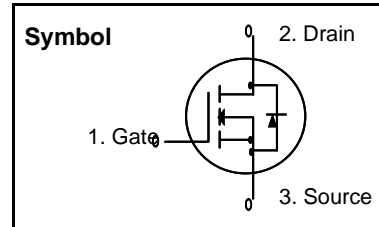


## N-Channel MOSFET

### Features

- $R_{DS(on)}$  (Max 2.5  $\Omega$ ) @  $V_{GS}=10V$
- Gate Charge (Typical 15nC)
- Improved dv/dt Capability, High Ruggedness
- 100% Avalanche Tested
- Maximum Junction Temperature Range (150°C)



### Absolute Maximum Ratings

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain to Source Voltage	600	V
$I_D$	Continuous Drain Current(@ $T_C = 25^\circ C$ )	2.8	A
	Continuous Drain Current(@ $T_C = 100^\circ C$ )	1.8	A
$I_{DM}$	Drain Current Pulsed (Note 1)	11.2	A
$V_{GS}$	Gate to Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulsed Avalanche Energy (Note 2)	218	mJ
$E_{AR}$	Repetitive Avalanche Energy (Note 1)	4.9	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.5	V/ns
$P_D$	Total Power Dissipation(@ $T_C = 25^\circ C$ )	49	W
	Derating Factor above 25 °C	0.39	W/°C
$T_{STG}, T_J$	Operating Junction Temperature & Storage Temperature	- 55 ~ 150	°C
$T_L$	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds.	300	°C

### Thermal Characteristics

Symbol	Parameter	Value			Units
		Min.	Typ.	Max.	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	-	-	2.56	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient*	-	-	50	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	-	-	110	°C/W

\* When mounted on the minimum pad size recommended (PCB Mount)

**Electrical Characteristics** ( $T_C = 25\text{ }^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	600	-	-	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature coefficient	$I_D = 250\mu A$ , referenced to $25\text{ }^\circ\text{C}$	-	0.6	-	V/ $^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS} = 600V, V_{GS} = 0V$	-	-	10	$\mu A$
		$V_{DS} = 480V, T_C = 125\text{ }^\circ\text{C}$	-	-	100	$\mu A$
$I_{GSS}$	Gate-Source Leakage, Forward	$V_{GS} = 30V, V_{DS} = 0V$	-	-	100	nA
	Gate-source Leakage, Reverse	$V_{GS} = -30V, V_{DS} = 0V$	-	-	-100	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	-	4.0	V
$R_{DS(on)}$	Static Drain-Source On-state Resistance	$V_{GS} = 10V, I_D = 1.4A$	-	2.0	2.5	$\Omega$
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$	-	545	710	pF
$C_{oss}$	Output Capacitance		-	60	80	
$C_{rss}$	Reverse Transfer Capacitance		-	8	11	
<b>Dynamic Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 300V, I_D = 4.0A, R_G = 25\Omega$ (Note 4, 5)	-	10	30	ns
$t_r$	Rise Time		-	35	80	
$t_{d(off)}$	Turn-off Delay Time		-	45	100	
$t_f$	Fall Time		-	40	90	
$Q_g$	Total Gate Charge	$V_{DS} = 480V, V_{GS} = 10V, I_D = 4.0A$ (Note 4, 5)	-	15	20	nC
$Q_{gs}$	Gate-Source Charge		-	2.8	-	
$Q_{gd}$	Gate-Drain Charge(Miller Charge)		-	6.2	-	

**Source-Drain Diode Ratings and Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit.
$I_S$	Continuous Source Current	Integral Reverse p-n Junction Diode in the MOSFET	-	-	2.8	A
$I_{SM}$	Pulsed Source Current		-	-	11.2	
$V_{SD}$	Diode Forward Voltage	$I_S = 2.8A, V_{GS} = 0V$	-	-	1.4	V
$t_{rr}$	Reverse Recovery Time	$I_S = 4.0A, V_{GS} = 0V, di_F/dt = 100A/\mu s$	-	300	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	2.2	-	$\mu C$

**※ NOTES**

1. Repeatability rating : pulse width limited by junction temperature
2.  $L = 25mH, I_{AS} = 4.0A, V_{DD} = 50V, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
3.  $I_{SD} \leq 4.0A, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$
5. Essentially independent of operating temperature.

Typical Characteristics

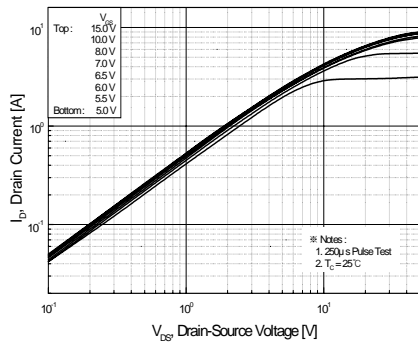


Figure 1. On-Region Characteristics

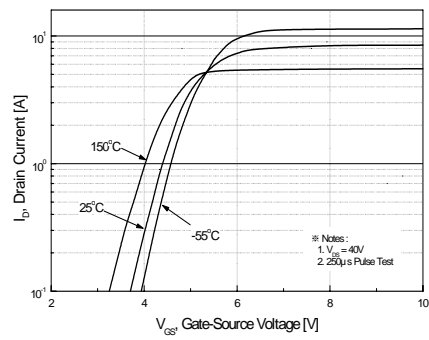


Figure 2. Transfer Characteristics

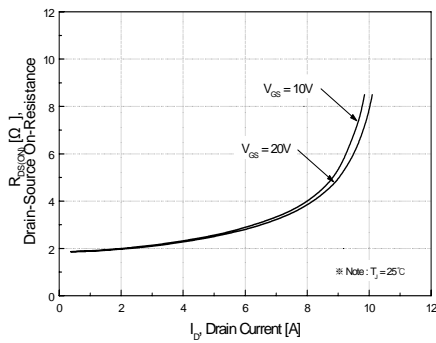


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

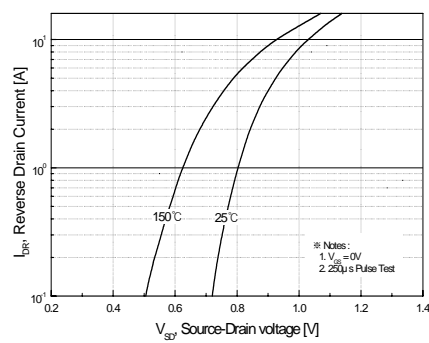


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

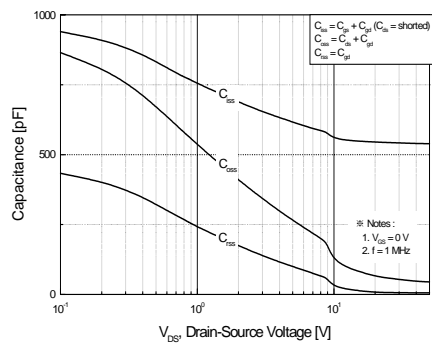


Figure 5. Capacitance Characteristics

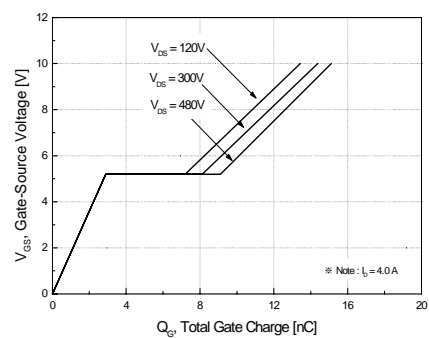


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

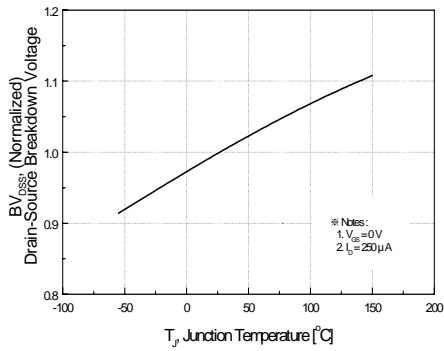


Figure 7. Breakdown Voltage Variation vs Temperature

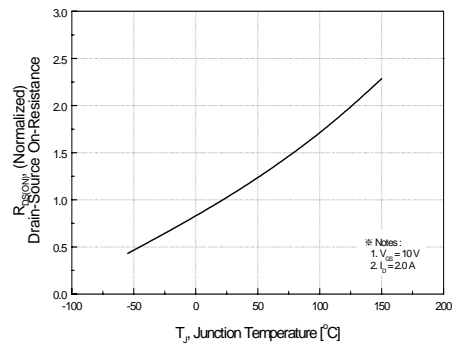


Figure 8. On-Resistance Variation vs Temperature

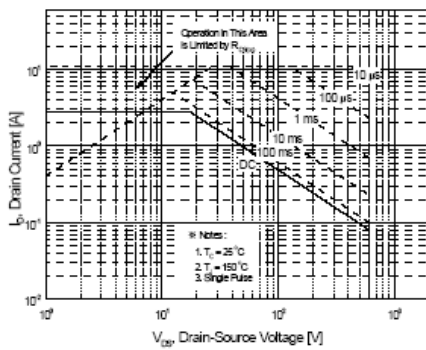


Figure 9. Maximum Safe Operating Area

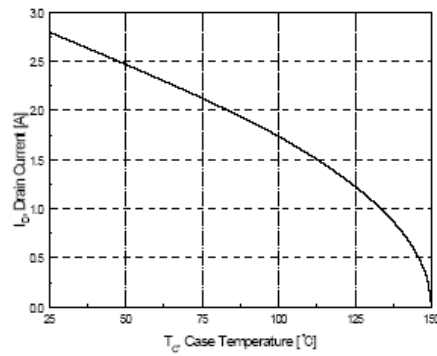


Figure 10. Maximum Drain Current vs Case Temperature

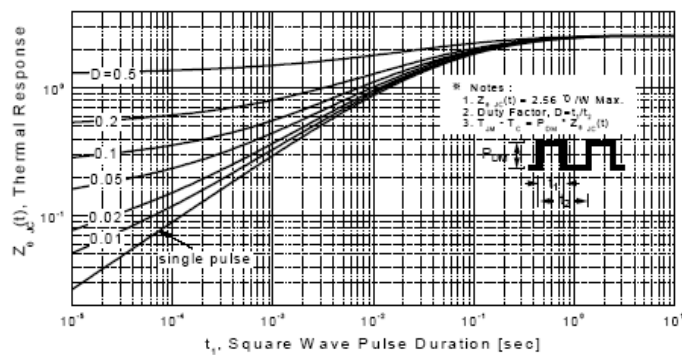
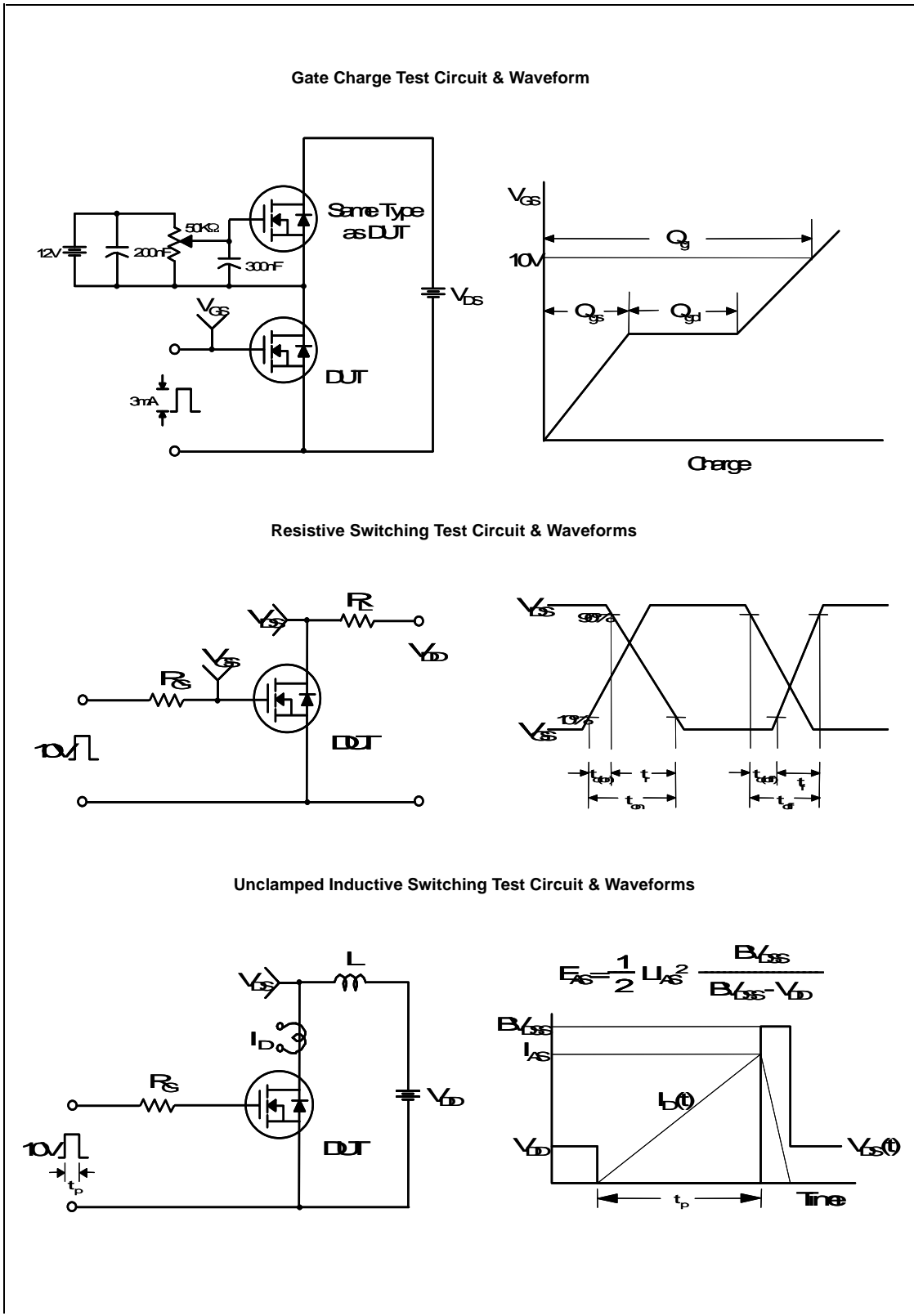


Figure 11. Transient Thermal Response Curve



Peak Diode Recovery dv/dt Test Circuit & Waveforms

