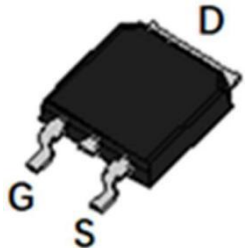
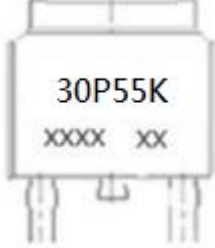
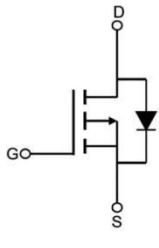




30P55K (File No.: S&CIC1841) **P-channel Enhancement Mode Power MOSFET**

Description

<p>Features</p> <ul style="list-style-type: none"> ➤ $V_{DS} = -30V$, $I_D = -40A$ $R_{DS(ON)} < 11m\Omega @ V_{GS} = -10V$ $R_{DS(ON)} < 16m\Omega @ V_{GS} = -4.5V$ ➤ Advanced Trench Technology ➤ Excellent $R_{DS(ON)}$ and Low Gate Charge ➤ Lead free product is acquired 	<p>Application</p> <ul style="list-style-type: none"> ➤ PWM Applications ➤ Load Switch ➤ Power Management <p style="text-align: center;">100% UIS TESTED! 100% ΔV_{ds} TESTED!</p>	
 <p>TO-252(DPAK) top view</p>	 <p>Marking and pin Assignment</p>	 <p>Schematic Diagram</p>

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise specified)

Symbol	Parameter	Max.	Unit
V_{DSS}	Drain-Source Voltage	-30	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ C$	-40
		$T_C = 100^\circ C$	-26
I_{DM}	Pulsed Drain Current ^{note1}	-134	A
E_{AS}	Single Pulsed Avalanche Energy ^{note2}	98	mJ
P_D	Power Dissipation	$T_C = 25^\circ C$	24.8
$R_{\theta JC}$	Thermal Resistance, Junction to Case	4.9	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ C$



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-30V, V_{GS}=0V$	-	-	-1	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.6	-2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=-10V, I_D=-20A$	-	8.5	11	m Ω
		$V_{GS}=-4.5V, I_D=-10A$	-	12.0	16	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V,$ $f=1.0MHz$	-	3564	-	pF
C_{oss}	Output Capacitance		-	416	-	pF
C_{riss}	Reverse Transfer Capacitance		-	373	-	pF
Q_g	Total Gate Charge	$V_{DS}=-15V, I_D=-20A,$ $V_{GS}=-10V$	-	37	-	nC
Q_{gs}	Gate-Source Charge		-	6.5	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	9.4	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=-15V, I_D=-20A,$ $V_{GS}=-10V, R_{GEN}=2.5\Omega$	-	16	-	ns
t_r	Turn-on Rise Time		-	21	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	68	-	ns
t_f	Turn-off Fall Time		-	52	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-40	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-134	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=-30A$	-	-0.8	-1.2	V

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: $T_J=25^\circ\text{C}$, $V_{DD}=-15V$, $V_G=-10V$, $L=0.5mH$, $R_G=25\Omega$, $I_{AS}=-20A$

3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$



Typical Performance Characteristics

Figure 1: Output Characteristics

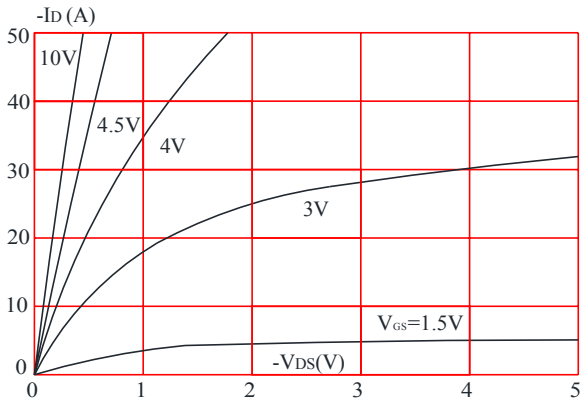


Figure 2: Typical Transfer Characteristics

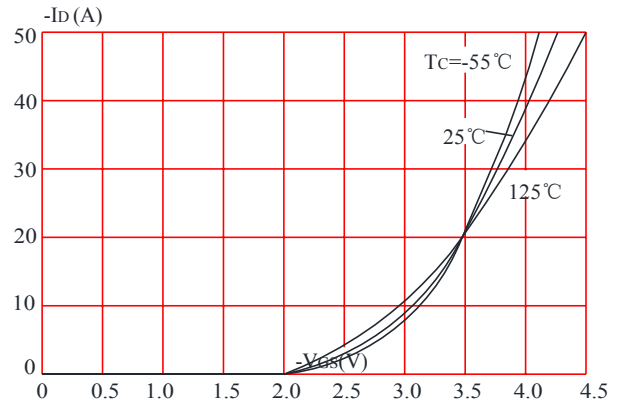


Figure 3: On-resistance vs. Drain Current

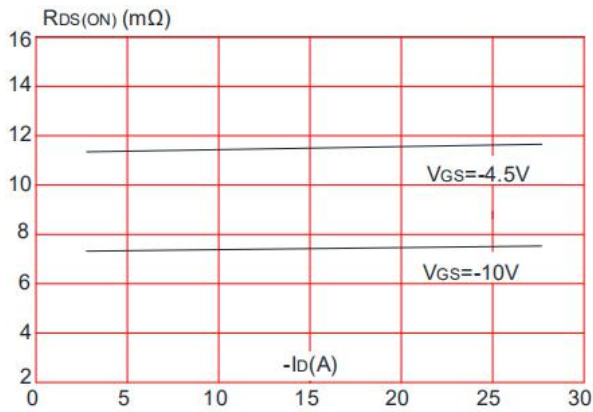


Figure 4: Body Diode Characteristics

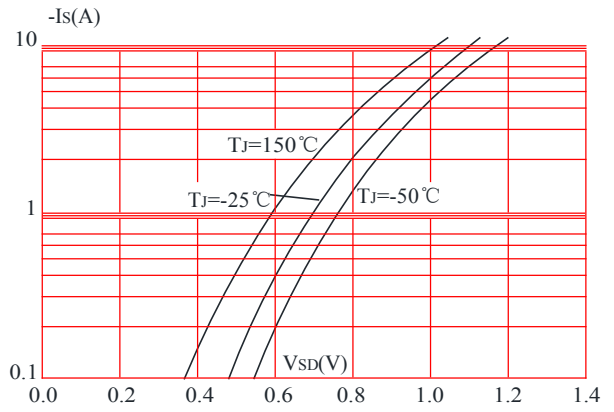


Figure 5: Gate Charge Characteristics

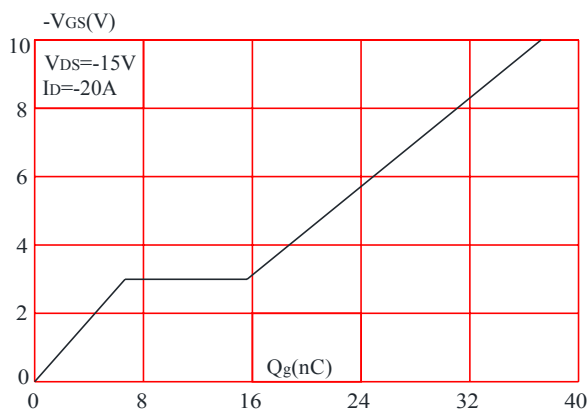


Figure 6: Capacitance Characteristics

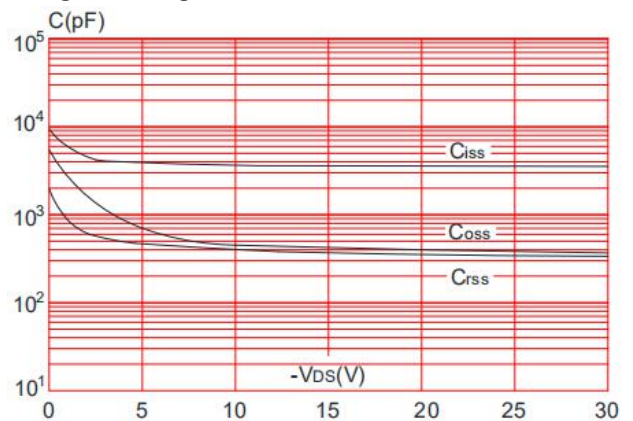




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

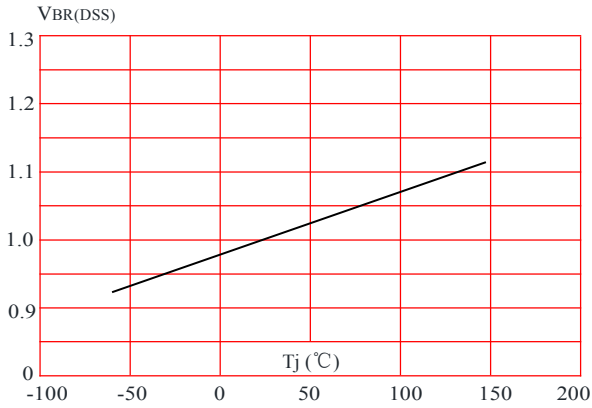


Figure 8: Normalized on Resistance vs. Junction Temperature

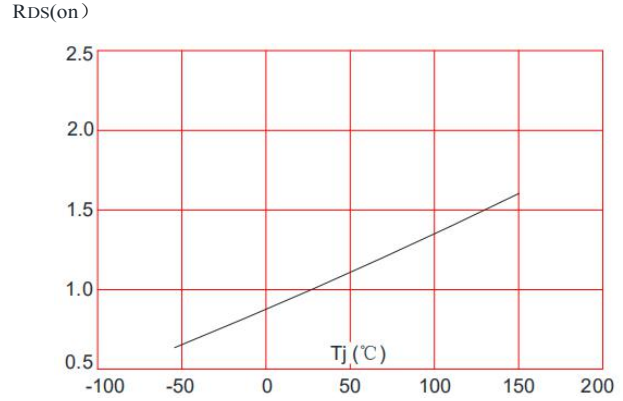


Figure 9: Maximum Safe Operating Area

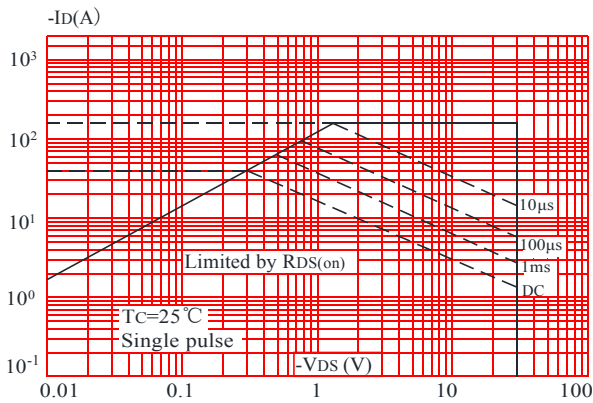


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

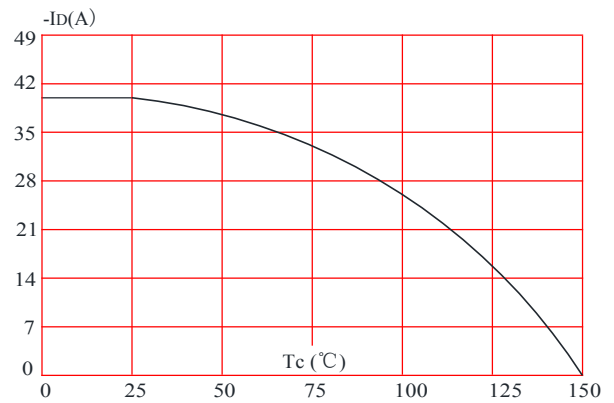
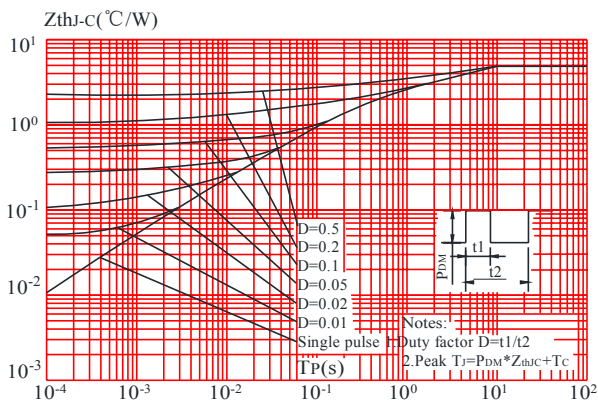


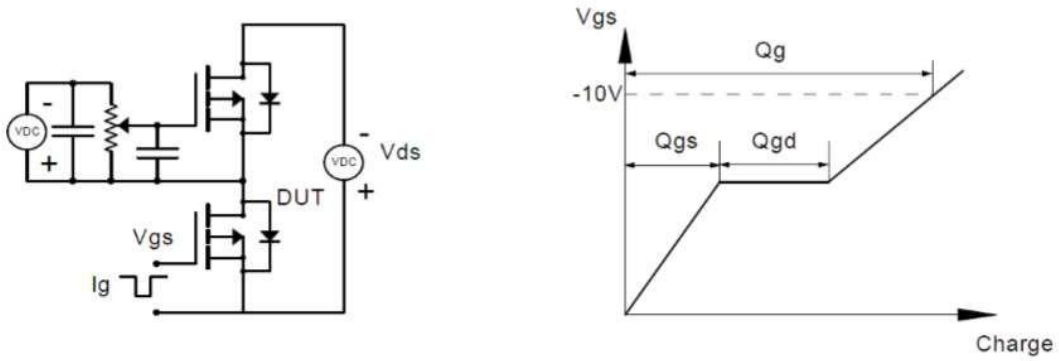
Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



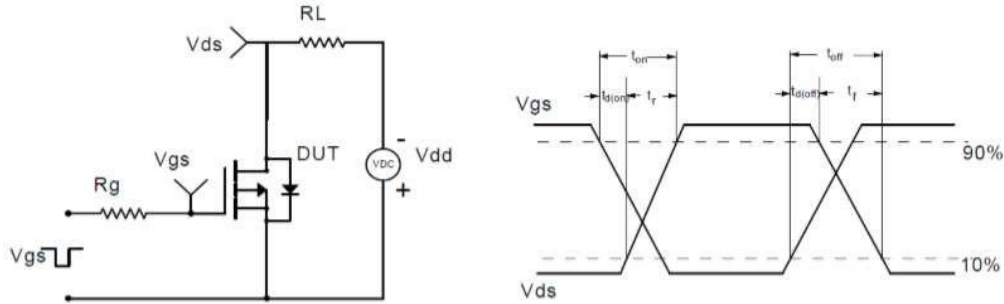


Test Circuit

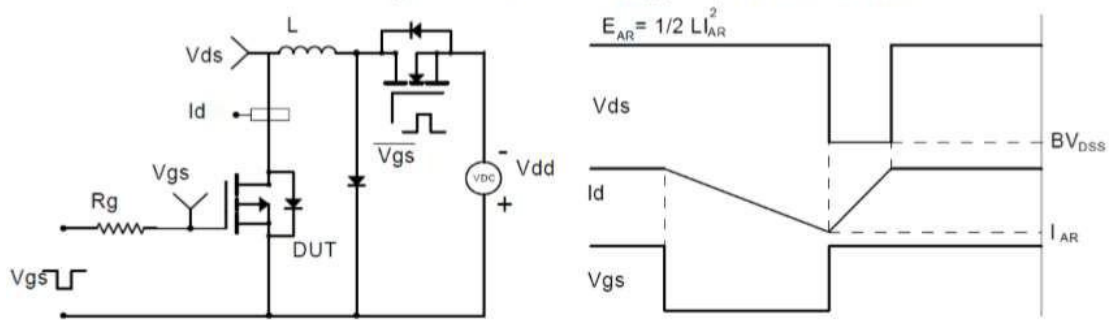
Gate Charge Test Circuit & Waveform



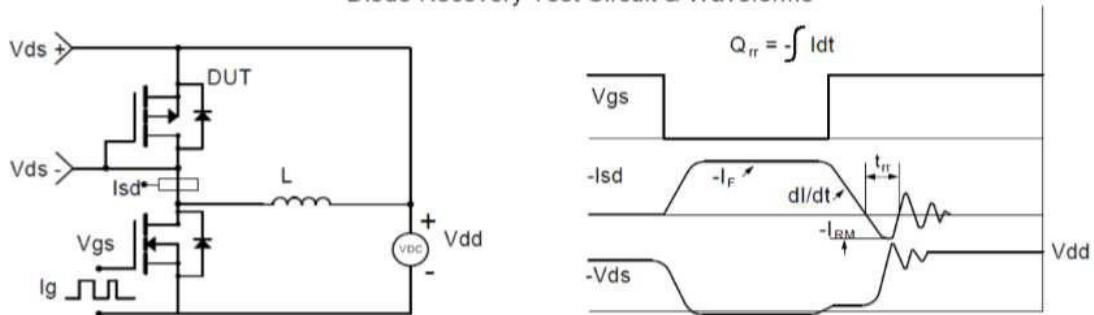
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

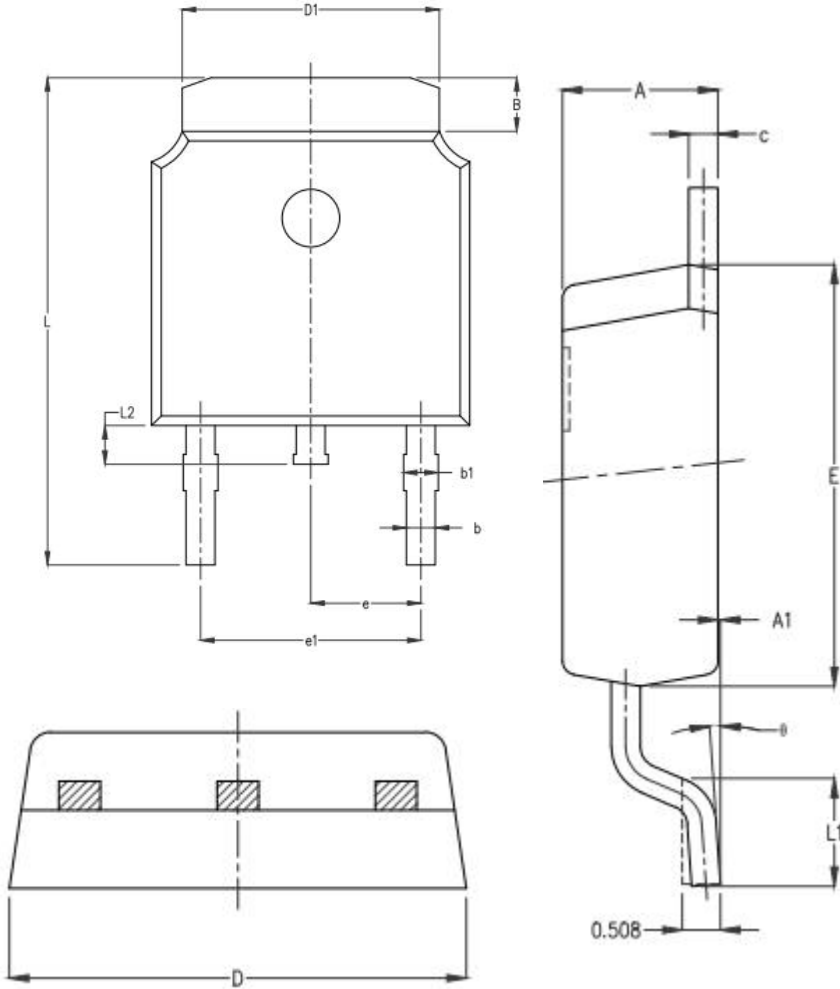


Diode Recovery Test Circuit & Waveforms





TO-252 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.15	2.25	2.35
A1	0.00	0.06	0.12
B	0.96	1.11	1.26
b	0.59	0.69	0.79
b1	0.69	0.81	0.93
c	0.34	0.42	0.50
D	6.45	6.60	6.75
D1	5.23	5.33	5.43
E	5.95	6.10	6.25
e	2.286TYP.		
e1	4.47	4.57	4.67
L	9.90	10.10	10.30
L1	1.40	1.55	1.70
L2	0.60	0.80	1.00
θ	0°	4°	8°